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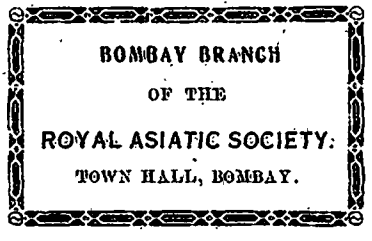

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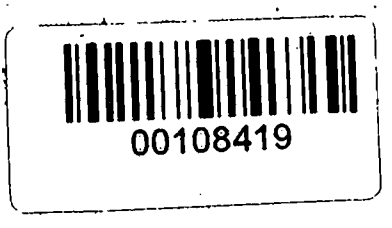
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A HAND-BOOK TO THE FORESTS

OF THE

Bombay Presidency.

No. I.

A DESCRIPTIVE LIST

OF THE

FOREST TREES OF INDIA;

BEING

A COMMENTARY ON, AND EXPANSION OF, THE LIST OF TIMBER TREES BY DR. WIGHT, OF THE MADRAS ESTABLISHMENT.

No. II.

DESCRIPTION OF THE SYSTEM ADOPTED

FOR THE

FOREST CONSERVANCY OF THE BOMBAY PRESIDENCY.

No. III.

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PRACTICAL HINTS

ON THE

PLANTING OF ROAD-SIDE TREES.

BY

SURGEON ALEXANDER GIBSON, F.L.S.,

CONSERVATOR OF FORESTS, AND SUPERINTENDENT BOTANICAL GARDENS, BOMBAY PRESIDENCY.

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CONTENTS.

No. I.—LIST OF TIMBER TREES.

	PAGE
Preface	iii
Woods procurable in the Coimbatore District (Section I.)	1
Additional list of woods	17
List of woods procurable in Western India (Section II.)	21

No. II.—CONSERVANCY OF FORESTS IN THE BOMBAY PRESIDENCY.

Preface	51
Situation of the Teak Forests in the Bombay Presidency	53
Branches of forest country in the Satpoora range of hills	ib.
Forest of Barrie and those to the north of Kupperwunje not included in the enumeration	ib.
Forests on and near the Taptee river	54
Forest on the Nessno river, south of the Taptee, in the Nowapoora Mahal ..	ib.
Forty-six villages of the above furtively appropriated by the Gaekwar Government's discovery of the fraud	ib.
Northern part of the Dang forest, and limits of that rented from the Rajas by the British Government	55
Terms of the lease; difficulty of imposing some of these	ib.
Description of wood chiefly found in the Dang	56
Other jungle woods	ib.
Duties to which the timber is liable in passing through the Baroda and Gaekwar districts after leaving the forest	ib.
Difficulty of exporting the timber grown in the eastern part of the Dang to the coast, and hence reason for forming a depôt at Chowrudah in the northern part of the Nassick district	ib.
Scattered jungles south of the Dang, in the Bugwarra Purgunn and near Daundegunga	57
Dhorumpoor or Rummeggur forests	ib.
Rammeggur forests may afford a supply of crooks	ib.

PAGE

Waste caused by cutting small rafters 57
Forest of Peth Hursool; injury done by excessive lopping; Tewas or Tunnus wood common 58
Forest in Sungum Talooka .. .. ib.
Forest on the northern border of Sungum 59
Forests of Kulwun, Mokhara, and Warrole .. .. ib.
Comparative quantity of old and new wood in Mokhara .. .. ib.
Utility of removing timber trees 60
Scarcity of crooked pieces 60
Jungle timber exhausted in the Rassin Talooka 61
Jungle timber exhausted in the Mahim Talooka 61
Jungle timber of Bhewndy, Tallajeh, and Mogelur .. .. ib.
Scrub on the Ghaut faces 62
Teak and Sessoo preserves of Kullian and Tanna .. .. .. ib.
Cassimera forest; its climate .. .. ib.
Panwell forest and forest around Kurnalla 63
Teak in the Nizampoor Talooka .. .. ib.
Teak in the Kolapoor Mahal, Pena Talooka, and Nagotna Mahal .. 64
Young Teak in the Rajpooree Talooka, the Mahals of Nizampoor and Tulleh, Colaba, and Alibagh 65
Forest in the Raeghur Talooka, with its Mahals Beerwaree, Kondree, and Goregaon 66
Forest of the Tooreel and Yenereh Tuppas 67
Peculiar tenure which existed in the forests of the three southern Talookas .. 68
Recapitulation of Mr. Dunlop's proclamation of 1822 69
Forest in the Southern Konkun south of the Savitree river, Ratnagherry Collectorate .. .. ib.
Injurious effects of the proclamation of 1822 in the Ratnagherry Collectorate. ib.
Government preserve on Anjerle creek .. .. ib.
Plantations on the Dabol creek 70
Teak in the Ratnagherry and neighbouring Talookas .. .. .. ib.
Preserve at Mann and Kandalgaom .. .. ib.
Teak on the borders of the Warre State 71
Savunt Warre forest .. .. ib.
Forest from Kearee to Kolapoor; destructive influence of Kumree cultivation in 72
Hebulee or Pat Phunus and Poon .. .. ib.
Soonda and Canara forest .. .. ib.
Extent of control in the Soonda forest only nominal 73
Part of the Soonda forest most favourable for Teak growth .. .. ib.
Extent of Soonda forest over-estimated by the Madras authorities .. ib.
Possible extinction by the Coast-cutter .. .. ib.
Wild eastern portion contains only green wood jungle, no Teak 74
Chandore forest, planted by the late Mr. Conolly .. .. .. ib.
The Dhewar and Belgaum forests .. .. ib.
Forest country from Belgaum to the northern limits of Sattara 75

PAGE

Conservancy measures in the Sattara State 76
Forest in the Poorundhur and Singhur valleys .. .. ib.
Importance of these preserves for the bare country to the east . .. .. ib.
Thinnings at the Singhur and Poorundhur forests 77
Teak preserves near Poona .. .. ib.
The share system introduced here; its details .. .. ib.
Forest between Poona and the Bheema river to the west .. .. .. ib.
Forests of the Gor, Kookry, Mool, and Pruvara valleys 78
Preserves of Water Jambool .. .. ib.
Forests on the slopes of the Darna river and in the Dindoree Talooka .. 79
Tewus or Tunnus frequent here... .. .. ib.
Forests in the Baglan Talooka of Khandeish and north of the Taptee, and on the Satpoora range .. .. ib.
Babool preserves in the eastern districts of Poona and Ahmednuggur 80
Mode of making these preserves yield an annual return 81
Net profit in 1854-55 .. .. ib.
Babool preserves in Poorundhur Talooka and in certain parts of the Belgaum Collectorate 82
Detail as to the mode of managing the forest generally .. .. ib.
Effects of the reckless system of cutting and burning 83
Mistaken policy at first persued in regard to our forests .. .. .. ib.
Subject taken up by the Bombay Government in 1838 .. .. ib.
Timber for naval and other public purposes must continue to be procured from the Dang, Soonda, and Malabar forests .. .. ib.
Wisdom of the measures for renting the Dang 84
Poon spars, source of supply .. .. ib.
Objects of the forest conservancy .. .. ib.
Diminished supplies of timber owing to excessive destruction of forest .. .. ib.
Ruinous system persued by Inamdars in regard to forest .. .. .. ib.
Continual references and disputes arising out of the system pursued by Inamdars; a palliation suggested 85
Provision for the wants of the Ryots under the conservation system .. .. ib.
Rab grounds of the Ryots preserved to them with the exception of royalty trees. ib.
Great want of raw material in many districts owing to improvidence of the villagers .. .. ib.
Assistance afforded in aid of this want .. .. ib.
Rueghur Talooka destitute of a single material for burning 86
Danger of allowing indiscriminate access to the young forest . .. .. ib.
System of giving forest shares to Khotes .. .. ib.
Inconveniences of the share system .. .. ib.
Extension of the share system to other heads of villages not deemed advisable; reason why 87
Trimming enjoined on heads of villages and others on pain of forfeiture of the portion of their share which may have been applied to cover the expenses. ib.
Security taken from villagers when allowed to trim the trees for the use of their fields .. .. ib.

PAGE

The system of conservancy 88
Establishment entertained for the Dang forests.. .. .. ib.
The officers in charge of the Dang enjoined to visit the forest at stated periods .. .. ib.
Duty of the northern officers to see that the forest boundaries are carefully kept, and that the Dang people do as little damage as possible .. .. ib.
Measures for guarding the eastern border of the Dang 89
Advantage of locating the Second Assistant on the eastern border .. .. ib.
The Northern Assistant also enjoined to look after detached pieces of forest beyond the Dang .. .. ib.
Supplies furnished by the Northern Assistant .. .. ib.
Mode of conducting the timber supply 90
Rate of charges made by the northern branch .. .. ib.
Annual meeting with the Dang Rajas .. .. ib.
Payment of the annual rent by Government .. .. ib.
Beneficial effects of the Dang rent in a political view .. .. ib.
Expense of military expeditions into the Dang, and increase to the pension list caused by them 91
Difficulties arising out of the shares of the Gaekwar in Dang villages .. .. ib.
Bad effects of giving up the rights the British Government held on the fort of Salheir .. .. ib.
Pecuniary results from renting the Dang forests .. .. ib.
Heavy duties levied on our timber in passing the Chowkees of the Bansda Raja and the Gaekwar 92
These duties levied from us, while all the produce from the forests of these States passes through our territory free .. .. ib.
Great importance of a good road through the Dang .. .. ib.
Impossibility of floating timber by the rivers in the Dang .. .. .. ib.
Southern branch; details of management .. .. ib.
Causes which led to the appointment of a Timber Agent for Malabar and Canara 93
Failure of the attempt to work the Palghaut forest .. .. ib.
Failure of first attempt at supply from the Anamalla forest .. .. .. ib.
Reasons which led to the appointment of Mr. Poulton as Assistant to Captain Williams .. .. ib.
Profits of the timber supplied from the Government forests in Canara and Soonda 94
Mode in which these profits were calculated .. .. ib.
Destructive effects of a permission which had been given to the Contractor .. ib.
Permission annulled in 1846 .. .. ib.
Large sum realised by sale of rejected wood 95
Proposal to reduce Mr. Poulton's salary abandoned .. .. ib.
Mr. Poulton's appointment placed on a new footing in 1852 .. .. .. ib.
The new appointment tended to neutralise inconveniences formerly experienced under a divided agency 96
Mode of conducting the duties of the Southern Branch .. .. .. ib.

PAGE

Bad effects of Mr. Poulton having no direct control over the Revenue Officers in forest matters 97
Establishment of the office of the Southern Branch for Canara.. .. .. ib.
Establishment in Malabar .. .. ib.
Supplies made from the Southern Branch .. .. ib.
Central Districts managed by the Conservator himself.. 98
Department when organised .. .. ib.
Different tours made by the Conservator between 1840 and 1850 .. .. ib.
Sanction of Supreme Government to Conservator's appointment in 1847 .. 99
Jungle fee system established in 1850 .. .. ib.
Colaba forest added to the Conservator's charge in 1852 100
Visits of the Conservator to Sind.. .. .. ib.
Conservation in the Rutnagherry Collectorate in 1854.. .. .. .. ib.
Charge of the naval timber in Bombay made over to the Conservator in 1854. ib.
Mr. Williams appointed Assistant in 1854 for the Bombay Branch 101
System on which the Conservator's duties are conducted 102
Establishment of Forest Keepers.. .. .. ib.
Additional or reserve hands often necessary for supplying casualties 103
Contingent allowance .. .. ib.
Deficiencies how supplied when necessary .. .. ib.
Confusion in the accounts how avoided .. .. ib.
Mode of dealing with cash sanctioned for expenses .. .. ib.
A Marathi as well as English register kept of all payments 104
Arrangements for timely issue of pay to foresters monthly .. .. .. ib.
Realisations on account of forest how credited 105
Pay of the Jemedars and Peons .. .. ib.
Jungle fee establishment.. .. .. ib.
Formerly kept up by the Komavisdars, and paid from the fees.. .. .. ib.
System changed since 1854 .. .. ib.
Much labour and detail caused by the change .. .. ib.
Fees generally farmed .. .. ib.
Arrangements for the extension of the fee system to the Poona and Ahmednuggur Collectorates 106
Arrangements for fixing the boundaries of Jagheer villages in concert with the Revenue Survey Officers .. .. ib.
Karkoon for assisting to fix the forest reserves in the Rutnagherry Collectorate. ib.
Also in the Ahmednuggur Collectorate .. .. ib.
Utility of paper drawn up by Mr. Tytler .. .. ib.
Rules in the Conservator's Department 107
Teak and Seesoo are Government royalties; exceptions made under a supplemental rule of the Revenue Survey .. .. ib.
List of excepted villages to be furnished to the Collector .. .. .. ib.
Exceptions .. .. ib.
Claims established under the proclamation of 1822 .. .. ib.
Trees growing within the house precincts of cultivators and others .. .. ib.
Rules as to cutting by Inamdars who have the privilege of forest .. .. ib.

PAGE

Occasional donations to public buildings in villages 108
Responsibility of Khote shareholders for the forest in their villages .. .. ib.
Darekurees to be dealt with by the Khote shareholders.. .. .. .. ib.
Mortgagees not permitted to alienate the forest of their villages .. .. ib.
Other descriptions of wood besides Teak and Seesoo may be reserved for public use at the discretion of the Conservator 109
Penalties on the destruction of Tunnus wood .. .. ib.
Water Jambool .. .. ib.
Permission to cut jungle timber must be obtained from the Komavisdar .. ib.
Exception of non-cultivating classes from fees only temporary 110
Rule regarding timber for export .. .. ib.
Penalties for cutting without license .. .. ib.
Season for cutting Teak and Seesoo .. .. ib.
Season for cutting jungle timber.. .. ..
Season for trimming .. .. ib.
Mode of disposing of fallen and old wood .. .. ib.
Agreements for trimming on security given .. .. ib.
Rules as to Dulleeran or Koomree cultivation 111
Penalty for destroying Teak or Seesoo in Dulleeran land .. .. .. ib.
Gheras of hill-forts to be reserved as much as possible for forest .. .. ib.
Order of annual proceedings in the forests .. .. ib.
Rules as to trimming when carried on by the Conservator's agency 112
Rules as to correspondence with Collectors and their subordinates .. .. ib.
Rules as to cutting trees in reclaimed land .. .. ib.
Assistance afforded to villages suffering from the effects of fire.. 113
Mode of dealing with forest offences .. .. ib.
Share of fines paid to informers .. .. ib.
Monthly report of such fines made to the Conservator .. .. ib.
Sale of grass on the Babool preserves .. .. ib.
Time for trimming the Babool preserves.. 114
Mode of thinning, and material how disposed of .. .. ib.
Sales of the Babool pods for sheep grazing .. .. ib.

No. III.—PRACTICAL HINTS ON THE PLANTING OF ROAD-SIDE TREES.

Preliminary Remarks 117
Process .. .. ib.
Precautions to be observed in choosing lines of road .. .. ib.
Distances of trees from made road and from each other 118
Nature of excavations, &c., and how these are best made .. .. .. ib.
Planting in clumps in sheltered situations not advisable.. 119
Reasons for the above opinion .. .. ib.
Planting in rich soil 120
Limestone.. .. .. ib.

PAGE

Rice-fields 120
Laterite .. .. ib.
Filling in, &c. of the holes, or consolidation of the mounds 121
Mode and time of planting 122
Kinds of trees to be planted or seeds to be inserted .. .. ib.
Noondrook ; Banyan .. .. ib.
Oomer 123
Peepree .. .. ib.
Indian Rubbur Fig, why not to be chosen .. .. ib.
Peepul not desirable for planting .. .. ib.
Neem .. .. ib.
Cassia Sumatrana (Kasood) 124
Tamarind 125
Mango .. .. ib.
Bendie (Thespesia populnea) .. .. ib.
Shewun (Gmelina arborna) .. .. ib.
Mogeer (Odina wodier) 126
Ambara (Spondias acuminata) .. .. ib.
Dalbergia seesoo .. .. ib.
Redleia Tileofolia, *alias* Glossospermum velutinum, not desirable .. .. ib.
Calophyllum inophyllum (Oondie) 127
Cedrela toona (Toona) .. .. ib.
Swedenia Mahogani (Mahogany) .. .. ib.
Bauhinia of sorts (Kunchun) .. .. ib.
Babool .. .. ib.
Sterculia fœtida (Bastard Poon) .. .. ib.
Spathodea Roxburghii (Mer Seengee) 128
Uvaria longifolia (Ashoca Asopala) .. .. ib.
Phyllanthus emblica (Aonla) .. .. ib.
Kurrunje (Pongamia glabra) .. .. ib.
Willow .. .. ib.
Hedging and further care of the trees after having been planted .. .. ib.
Hedges .. .. ib.
Bamboo cages 129
Babool branches 130
Care of the trees 131
Hoeing .. .. ib.
Hedging 132
Keepers .. .. ib.
Peons .. .. ib.
Watering the trees 133
Estimate of expense 134

No. I.

COMPRISING JUNGLE TIMBERS;

BEING

A COMMENTARY ON, AND EXPANSION OF, THE LIST OF TIMBER TREES,

BY DR. WIGHT,

MADRAS ESTABLISHMENT.

FIRST PUBLISHED IN THE "GOVERNMENT GAZETTE," MADRAS;

NOW ENLARGED BY

SURGEON ALEXANDER GIBSON, F.L.S.,

CONSERVATOR OF FORESTS, SUPERINTENDENT BOTANICAL GARDENS, BOMBAY PRESIDENCY.

PREFACE.

THE description of Forest Trees which stands first in the accompanying Treatise was drawn up by Dr. WIGHT, of Madras, a gentleman whose extensive botanical acquirements need not be descanted on here.

2. It was published in the *Madras Government Gazette*, but in this form it is (as may be supposed) accessible to few persons on this side of India.

3. In order to give it a more extensive publicity, the undersigned has incorporated it in the present Treatise, which, as will be observed, is in a great part a Commentary on the list of Dr. WIGHT, showing the names, localities, &c. of the different trees as they occur in the Western Presidency.

4. A great difficulty is often found in identifying, from their foreign trivial names, trees which are common with us.

5. This difficulty will, it is hoped, be partly remedied by the present Commentary.

6. The undersigned has added a number of trees which are not mentioned in the descriptive list of Dr. WIGHT, but which are nevertheless sufficiently common and important to be noticed here.

7. It was the intention of the undersigned to have accompanied this little work with pictorial illustrations, such as are given in the Arboretum of the late Mr. Lou[illegible].

8. It was, however, found that the difficulty and expense of getting these up were so great that the book, had it been published in this form, must have been too expensive for general circulation. The design was therefore for the present abandoned.

ALEXANDER GIBSON,
Conservator of F[illegible]

Camp Suptr. Sing, 10*th March* 1856.

INDIAN FOREST TREES.

WOODS PROCURABLE IN THE COIMBATORE DISTRICT.

SECTION I.

1	Acha marum ..... Diospyrus ebenaster (Ainslie). Ebenaceæ, Icon. 188. *Teemroo.** *Teemboornie.*	This name is copied from Ainslie, and I am still uncertain whether this is the species that yields the ebony of the Palghaut jungles, as there is reason to believe that more than one species contributes wood black enough to pass current for Ebony. The plant produced to me under that Tamool name is Bauhinia tomentosa, a widely different tree, but having a very dark or black heartwood.
2	Aglay marum ..... Chickrassa tubularis. Cedrelaceæ, iii. 56. *Pabha.*	This is the Swietenia chickrassa of Roxburgh and Ainslie, the Chittagong wood of commerce. Here it, in common with one or two other light red-coloured woods, currently pass under the general name of Cedar and Bastard Cedar, and are extensively employed in cabinet-making; this has quite a cedar-like smell.
3	Alingie marum ..... Alangium decapetalum. Alangicæ, Icon. 194. *Ankool.*	The wood of this small tree is sold by Roxburgh to be beautiful, and when tried was found to sustain a weight of [illegible] lbs.; but it wants size. I have never seen a tree that would give a 10-inch wide plank.
4	Angelic marum ..... Artocarpus hirsuta. Artocarpeæ.	This is the Artocarpus pubescens of Willd. Ainslie; it is scarcely entitled to a [illegible] this list of Coimbatore woods, but of the coast, and not exte[illegible]

* The *italic* lines in the second column throughout this section indicate [illegible]

	Hebulsoo. *Pat funnus.*	inland. It is a large tree, used on the coast for making canoes and such like purposes.
5	Anny currevor..... Woody marum. Odina woodiar. Terebinthaceæ, Icon. 60. *Mogeer.*	Called also Ooday, and generally supposed a very useless tree. The wood is very difficult to season, requiring to be kept, even in planks, two or three years; but once well seasoned it is a close-grained, beautiful wood, well adapted for cabinet-making purposes.
6	Atche marum ..... Bauhinia racemosa. Leguminosæ. *Apta.*	This is Bauhinia parviflora of Roxburgh, not mentioned by Ainslie. The tree is small, but the heart-wood exceedingly hard and fine. The bark furnishes a kind of natural rope, being merely peeled and slightly twisted, when it is ready for use.
7	Ayah marum ..... Ulmus integrifolia. Ulmaceæ. *Wowlee.*	A large-sized tree; wood reddish coloured; good for general purposes; said to yield to boiling water a peculiar odour, which, when mixed with common arrack, gives it the flavour of the more expensive Palmira arrack, and enables the vendors to obtain better prices for their adulterated article.
8	Boofallie marum..... Gevotia rottleriformis. Euphorbiaceæ. *Reetha.*	It seems curious that this tree, so common in Southern India, has not yet been named in any work of systematic botany. I have not yet learned anything regarding the timber; one carpenter here speaks disparagingly of it; but I do not consider him a trustworthy authority.
9	Coat attie..... Ebony (Ainslie). Bauhinia tomentosa (Ainslie). Leguminosæ.	This, like the Atche marum, is a strong, very dark-coloured wood; hence I presume the name Ebony. Even the younger branches show the heart-wood very dark brown. The bark of this is also employed as extemporary cordage. The plant furnished to me under this name is Bauhinia racemosa.
	Cadali pau ..... Lagerstræmia regina. Myrtaceæ, Icon. 413.	This tree is more celebrated for its large handsome flowers than for its timber, which last, however, is used for common purposes.
	[illegible]oop marum	This is a very large tree; the wood white and

	Terminalia belerica. Combretaceæ, iii. 91. *Yehela.*	rather soft; and may possibly be the true Vellei murdah.
12	Choar kullee marum .... Soymida febrifuga. Cedrelaceæ (Roxb. c. 17). *Rheyn.*	This is the Swietenia febrifuga of Roxburgh and Ainslie. I have not seen the wood, and only know of its existence here from botanical specimens of the tree brought under that native name. The wood is said to be most durable and strong.
13	Coommy marum..... Gmelina arborea. Verbenaceæ, Icon. 1470. *Shewun.*	A moderate sized tree, rather frequent on the Malabar Coast. I do not know anything of the timber.
14	Curroopally marum..... Putranjiva Roxburghii. Euphorbiaceæ (Royle's Illust. 100). *Jeewunpootr.*	I have not seen this tree, but Roxburgh describes it as a large timber tree, with an erect, straight trunk. The wood is white, close-grained, and very hard.
15	Currengally marum..... Acacia sundra. Mimoseæ (Roxb. c. 225). *Lal kheir.*	A rather large-sized tree; wood dark-coloured; very strong, a one-inch bar sustaining a weight of 500 lbs.; it is rather abundant in the jungles here.
16	Curry murah marum .... Terminalia glabra. *Aeen.* *Sadura.*	A large tree; wood dark-coloured; very hard, heavy, and strong, inch bars bearing from 430 to 450 lbs. Of this large beams are readily procurable for house-building purposes.
	Combretaceæ, Icon. 196, nearly represents this species.	See *Muradum.*
17	Curry vaimboo marum .. Garuga pinnata. Terebinthaceæ, Icon. 1594. *Kooruk.*	A considerable sized tree, with a round umbrageous head. I am not yet acquainted with the wood.
18	Curry vaugay marum..... Acacia odoratissima. Mimoseæ (Roxb. c. 120).	A dark-coloured, strong, and h[illegible] takes a good polish; can be [illegible] considerable abundance, a[illegible]

	Sirrus.	viz. about 1 foot square beams; is well fitted for naves of wheels; sustained 570 lbs.
19	Curvaila marum..... Acacia Arabica. Mimoseæ (Roxb. c. 149). *Babool.*	Under the name of Babool this very hard wood is extensively known, but is too small for most purposes; principally used for plough-shares and naves of wheels.
20	Cutchay cuttay marum... Venteak ven bugum. Lagerstrœmia microcarpa. Salicaricæ, Icon. 109. *Nanah.* *Bondara.*	This tree attains a large size, and for common purposes, where timber of inferior quality is sufficient, is very useful, being easily worked. Tested by the scale, it only bore 290 lbs.; on a second trial, however, it sustained 374 lbs.; were it more strong and durable, the length and straightness of the stem would adapt it for spars.
21	Eatty or Vitty marum.... Dalbergia sissoides. Leguminosæ. *Seesoo.* *Seesum.*	This is, perhaps, the best known in our jungles of the trees yielding blackwood, but there are several others as good, or perhaps better. It abounds in the Palghaut forests, but is rarely met with now of great size; when it and its congener Dalbergia latifolia are carried to Madras, it becomes one of the Rosewoods of the furniture shops.
22	Eichie marum..... Ficus tsicla (Roxb.). Moreæ, Icon. 668.	I presume, like all the other species of the Ficus, of very little value as timber. The people here know nothing of it.
23	Elavum marum ..... Eriodendron anfractuosum. Bombaceæ, Icon. 400. *Shameula.*	A soft, almost worthless wood, used by Moot-chee men for making toys and such like purposes.
24	Elooppe marum..... Bassia longifolia. Sapotaceæ, Ill. 147. Curry curray marum.	A light-coloured, hard, and durable wood, nearly equal in these respects to teak, but much smaller. Here it is much used in the construction of carts, where great strength is called for. In Malabar, where it attains a large size, it is used for spars.
	curray marum	See *Curry Vaimboo.*
	poottoo marum.... latifolia.	This tree seems less abundant here than the Eatty marum, perhaps from being more

	Leguminosæ, Icon. 1156. *Seesoo.* *Seesum.*	sought after, as yielding more valuable timber. It is very dark, heavy, and strong, sustaining a weight of 515 lbs.
26	Eroovaloo marum. ..... Inga xylocarpa. Mimoseæ (Roxb. c. 100). *Jamba.* *Yerool.*	A dark-coloured, hard, and very strong wood; excellent for nayes of wheels, and indeed for all purposes demanding great strength. I believe it is abundant in the Walliar forests. An inch bar sustained 550 lbs.
	Kadukai marum	See *Pillay murdah.*
27	Kulli (Milk-hedge) ..... Euphorbia tirucalli. Euphorbiaceæ. *Seyr.*	I have never seen this wood used, but have often heard it spoken of as excellent for gun-stocks. To me it seems too light-coloured.
	Kat pillah marum	See *Pillah.*
28	Kat yelloo mitch marum.. Atalantia monophylla. Aurantiaceæ, Icon. 1611. *Makur limbo.*	A small-sized tree; wood white, very fine, and close-grained, and, but for its want of size, well adapted for cabinet purposes. An allied species.
29	Kat yelloo mitch marum.. Limonia alata. Aurantiaceæ, iii. 41.	Tree small, but the wood is remarkably close-grained, hard, and heavy. It is a pale-yellow, or straw-coloured; if procurable of adequate size would be very valuable.
30	Klaare marum..... Casearia elliptica. Samydeæ. *Bhogara.*	This is a large shrub rather than a tree; the wood therefore can be of little value except for ornamental purposes. It is smooth, fine-grained, and yellow-coloured.
31	Koannay marum ..... Cassia fistula. Leguminosæ. *Baya.* *Gurmala.*	On the eastern side of the Ghauts, a small tree of great beauty when in flower, but too small to yield useful timber; in the Malabar forests, however, it attains sufficient size to adapt it for spars for native vessels. The wood, which is close-grained, is useful for making tool-boxes, &c.
32	Koattay maruth ..... Zizyphus œnoplia. Rhamneæ.	Specimens of this were brought as [illegible] to the class of timbers; but it [illegible] can only be for small ornament[illegible]

33	Koattay naga marum .... Eugenia jambolanum. Myrtaceæ, Icon. 535. *Jambool.*	Of this wood I have no knowledge; it is said to be brittle and bad, but is described by Ainslie as fit for house-building purposes.
34	Kodawah porsh ..... Chloroxylon swietenia. Cedrelaceæ, iii. 56 bis. *Hulda.*	This is the Satin-wood so highly esteemed in Ceylon, where it attains a large size. Until very lately I have never seen it exceed a good-sized shrub in India. The wood is very close-grained, takes a fine polish, and is fit for all kinds of ornamental purposes. In Ceylon, where it is abundant and well known, it is very highly esteemed.
	Kola murdah	See *Villay murdah.*
35	Kolcuttay teak marum .. Premna tomentosa. Verbenaceæ, Icon. 1468.	A small tree; the wood hard and close-grained, of a brownish-yellow colour, well fitted for ornamental purposes.
36	Kooda pallei marum .... Holarrhena codaga. Apocynaceæ, Icon. 1292.	A white but small-sized wood, very fine-grained, employed in cabinet-making.
37	Kromela marum ..... Gmelina Asiatica. Verbenaceæ, iii. 174.	This scarcely merits a place in this list, at least so far as I have ever seen it. The plant rarely attains the size of even a large shrub.
38	Kurkatta marum..... Zizyphus glabrata. Rhamneæ, Icon. 282. *Run bor.*	A moderate-sized tree, but the timber excellent, hard, close-grained, and taking an excellent polish; it is of a light-brownish colour.
39	Maah marum ..... Mangifera Indica. Terebinthaceæ. *Amb*	This timber seems but little used here, and no wonder, since so many much better kinds are to be had for the cutting and fetching.
40	Maghidam marum ..... Mimusops elengi. Sapotaceæ, Icon. 1586. *Mugkool.*	The quality of the wood is unknown to me, and being so much a cultivated plant, it is not probable that it is much used, and is therefore little known.
	Vaimboo marum ..	A soft, reddish-coloured, rather loose-textured

	Melia azadirachta. Meliaceæ, Icon. 160. *Neem.*	wood, which, however, takes a pretty good polish, and is much used here for cabinet-making purposes under the name of Bastard Cedar.
	Malay kongy	See end of list here.
42	Mandareh ..... Bauhinia acuminata. Leguminosæ.	This is the Bauhinia candida of Ainslie, which botanists think a variety of Koochnal (B. variegata), a larger and more common tree. Both are rare here, and I am not acquainted with the quality of the wood.
43	Marudam marum ..... Terminalia alata (Ainslie). T. tomentosa (Roxb.). Combretaceæ, Icon. 195. *Acen.*	A large and useful timber tree, employed on the coast for house-building and making canoes; I have not seen it in use here. It only differs externally from Curry murdah in being hairy, so that the same plate serves for both species.
44	Madoocarray marum .... Randia dumetorum. Rubiaceæ, Icon. 580. *Gehela.*	This seldom exceeds the size of a large shrub, and therefore scarcely merits notice here. The wood is hard and close-grained. The fruit is used in Malabar to poison fish.
45	Mavoolinga marum..... Cratœva Roxburghii. Capparideæ.	This is the Cratœva tapia of Ainslie, not of Linnæus. I am unacquainted with the timber, which Ainslie states to be used for many common purposes.
46	Moolloo vengay marum.. Briedelia spinosa. Euphorbiaceæ (Roxb. c 171). *Asun.* *Asanna.*	Wood not known here, though the tree is not uncommon, and attains a considerable size in the alpine jungles.
47	Moonnay marum..... Premna integrifolia. Verbenaceæ, Icon. 1469. *Chamaree.*	A common but usually a small tree, so that the timber is only useful for common purposes.
48	Moorkoo marum..... Erythrina Indica. Leguminosæ, Icon. 58. *Pangara.*	The Mootchie wood of the English; a [illegible] tree, but the wood soft, and only [illegible] mootchie work.

49	Munja cadumbay or adumbay. Nauclea cordifolia. Rubiaceæ (Roxb. c. 53). *Hedoo.*	A pretty close-grained, yellow wood, but soft. It is easily worked, attains a rather large size, and is much used for common purposes. On trial it sustained a weight of 320 lbs.
50	Munja pavuttay marum . . Morinda citrifolia. Rubiaceæ. *Bartondie.*	The wood of this tree is a deep brownish-yellow, and the roots are said to be used in dyeing. The quality of the wood, judging simply from the appearance, is little if at all inferior to the preceding, but the tree is much smaller.
51	Murravuttay marum . . . . Hydrocarpus inebrians. Flacourtianeæ, Icon. 942. *Kowtee.*	A common tree on the west coast; not so in the Coimbatore jungles. The quality of the wood is unknown to me.
52	Naraga marum . . . . . . Ehretia ovalifolia. Borragineæ, 1383.	A common but generally small tree in the Coimbatore district. I am still unacquainted with the quality of the timber; said to be useless.
53	Narvillie marum . . . . . . Cordea Rothii, Icon. 1379. C. obliqua, Icon. 1378. C. fulvosa, Icon. 1380. Borragineæ. *Bokur.*	This Tamool name seems to be applied indiscriminately to three or four species of the genus, so that it is impossible to say which is the one meant. Cordea obliqua, C. Rothii, and C. fulvosa have all been brought to me under this name. I believe the wood of all is very inferior, the trees being usually small.
54	Nat vadom cottay marum. Terminalia catappa. Combretaceæ, Icon. 172. *Bengali badam.*	A beautiful tree, which attains a large size in Malabar, where the wood is much esteemed; it is little known here.
55	Naurei, Narvillie, or Nawel marum. Eugenia caryophyllifolium. Myrtaceæ, Icon. 553.	I suspect this is the same as Koattay naga (above, No. 33). This is Ainslie's Calyptranthes caryophyllifolia, and his favourable account of the timber is such as its appearance would lead one to expect.
56	[illegible] cor cuddembay marum . . [illegible]uchea parvifolia. [illegible]ceæ, Icon. 129.	This is a strong, fine-grained timber, sustaining a weight of 400 lbs. Beams of considerable size are procurable. The wood is dark-

	Kullum.	coloured, and close-grained; but, according to Roxburgh, soon rots if exposed to wet. From the fineness of its grain, it seems well fitted for cabinet purposes, and has the advantage of being easily worked.
57	Nolhæ talic marum ..... Antidesma alexiteria. Antidesmeæ.	A common enough jungle tree, and a very handsome one; but I know nothing of the timber.
58	Nonna marum ..... Morinda citrifolia. Rubiaceæ. *Al.* *Bartondie.*	This is the proper Tamool name for the Munja pavuttay (see above, No. 50). Morinda umbellata is a climbing plant, and hence unfit for use as a timber; it has the same Tamool name.
59	Noolexly marum ..... Guatteria cerasoides. Anonaceæ (Roxb. c. 33). *Rat keenjul.*	A moderate sized tree; wood white and close-grained, at least in a three or four year old branch. I have not seen it as it appears in the trunk.
60	Nunjoonda marum ..... Gardenia turgida.	I only know this from small specimens, and am unable to say whether it is a tree or shrub, but believe the former; the wood, which is hard and close-grained, is useful in cases where small timber will serve it.
61	Nunjoonda marum ..... Balanites Ægyptiaca. Rutaceæ, Icon. 274. *Hingun bet.*	A small tree; the wood is said to be only good for fuel. These two trees, though sent to me under the same vernacular name, are most widely different, both as regards economical qualities and botanical characters and relations. I thence infer some mistake on the part of those who gave me these names.
62	Oony tokoo marum..... Tectona. *Sag.*	I am as yet uncertain whether to view this as a variety or distinct specimen of teak. Specimens tested here proved very inferior in strength to the true teak, breaking with a weight of only 300 lbs., while the other sustained above 400.
63	Padrie marum ..... Stereospermum suaveolens. Bignoniaceæ, Icon. 134. *Padeel.*	A considerable tree, frequent in the Wallar jungles; wood strong and elastic (said to be fitted for making bows); wood dark and good.

64	Pillah, or Peela marum (Jack). Artocarpus integrifolia. Artocarpeæ. *Phunnus.*	This is an excellent timber, at first yellow, but afterwards changing to brown; when made into tables and well kept, it soon attains a polish little inferior to Mahogany.
65	Paileæ marum..... Careya arborea. Myrtaceæ, iii. 99. *Koombha.*	Wood said to be bad; the bark, however, furnishes a ready-made cordage.
66	Pallay marum ..... Wrightia tinctoria. Apocynaceæ, Icon. 444. *Kala kooda.*	A common tree in the Coimbatore jungles, where it attains a considerable size; wood white, and close-grained,—in the words of Roxburgh coming nearer to ivory than any I know. It is not, however, much in use here.
67	Pana woodachie marum .. Calosanthes Indica. Bignoniaceæ, Icon. 1337. *Tetoo.*	Said to be a very soft and juicy wood, of no value.
68	Panichekai marum ..... Garcinia glutinifera.	This is one of the very few trees admitted into this list that I have not myself seen and verified, and is introduced in the hope that some resident on the Malabar Coast will favour me with specimens to determine its name and botanical relations.
69	Panna marum ..... Borassus flabelliformis. Palmæ. *Tar.*	Old blackwood of the Palmira; is next to that of Casuarina, the strongest I have seen tried; one specimen bore upwards of 700 lbs., and five of them gave an average of 648, though some were very bad.
70	Perooljoly marum ..... Hymenodyction utile. Rubiaceæ, Icon. 1150. *Kuruya.*	When I first gathered specimens of this tree I was informed that it furnished the wood called Bastard Cedar. This information, if correct at all, can only be partially so, as I have since found two others similarly reported. The tree attains a large size, and the heart-wood is red, but its qualities I have still to learn.
71	[illegible]	This tree resembles the Ash in its general

	Ailanthus excelsa. Zanthoxylaceæ, iii. 67. *Marook.*	appearance, and attains a large size. The wood is said to be hard, close-grained, and heavy, fit for gun-stocks. I am told that in Bombay it is much used in cabinet-making.
72	Pillay murdah marum.... Terminalia chebula. Combretaceæ. *Heerda.*	This is a most gigantic tree, furnishing planks three feet broad. It is a dark-coloured, heavy, and hard wood; very cross-grained, and difficult to work. It sustained about 400 lbs.
73	Pinnay, or Poonnay marum. Calophyllum inophyllum. Guttiferæ, Icon. 77. *Oondie.*	This tree is rare at this distance from the coast. the wood is coarse-grained, but very strong and durable, and on the coast is used in ship-building. In the alpine forests it attains a great size, and furnishes the Poon spars, so valuable for shipping. So far as I can learn there are two or three species of Calophyllum used for the same purpose under the general name of Poon.
74	Pinnay marum ..... Dillenia pentagyna. Dilleniaceæ. *Kurmul.*	The similarity of native names between this and Calophyllum inophyllum leads me to suspect some mistake here. The wood of Dillenia pentagyna is said to be exceedingly strong, and very durable, even when buried under ground; but as I have not yet succeeded in getting specimens, I cannot venture to offer any opinion, either as to the probability of this conjecture or the quality of the timber, which I might have done had I seen and examined a good sample.
75	Poocha cottay marum.... Sapindus emarginatus. Sapindaceæ. *Areeta.*	I suspect this is the same as Roxburgh's Sapindus detergens. The fruit is used for the same purposes as indicated by the characteristic native name. His S. emarginatus may be a different plant, as the fruit does not correspond. I do not know the wood further than that it is white, said to be only fit for fuel.
76	Poola marum ..... Bombax Malabaricum. Bombaceæ, iii. 29. *Saeer.*	A large tree, but the timber soft and watery, of no value; scarcely fit even for fuel.
77	Poolia marum	The wood of this well-known tree is little used,

	Tamarindus Indica. Leguminosæ. *Cheetz.* *Umlie.*	perhaps from its liability to become hollow in the centre, so as to prevent good planks being obtained. It is hard, durable, and finely veined.
78	Poonga marum ..... Pongamea glabra. Leguminosæ, Icon. *Kurunj.*	Wood said here to be only fit for fuel. Roxburgh, on the contrary, states that it serves for a variety of purposes. An oil is expressed from the seed.
79	Poorsung kai marum .... Thespesia populnea. Malvaceæ, Icon. 8. *Bendie.*	A strong, hard, and durable timber, but rarely to be met with good, owing to the trees rotting in the heart. It grows best near the coast.
80	Poovoo, or Poo marum .. Schleichera trijuga. Sapindaceæ. *Kusoomb.*	Red, strong, hard wood, generally rather small; used to make pestles, spokes for bandy wheels, and such purposes, where much strength in small space is required.
81	Poovutty marum..... Nephelium longanum. Sapindaceæ. *Woomb.*	A moderate-sized tree, having a straight trunk, and fine globular head. The wood is white, hard, and close-grained; but the carpenters here seem to be unacquainted with it.
82	Porasum marum ..... Butea frondosa. Leguminosæ (Roxb. c. 21). *Pullus.*	I can get no information regarding the wood, but Roxburgh gives some most interesting information regarding the juices of the tree as a dye and water colour.
83	Putchalay marum ..... Dalbergia paniculata. Leguminosæ (Roxb. c. 114). *Phussee.*	This tree attains a considerable size, but I am as yet unacquainted with the timber. It is said to be strong, and being of considerable size is fit for many purposes.
84	Purrembay marum ..... Prosopis spicigera. Mimoseæ (Roxb. c. 63). *Soundur.*	This tree attains a considerable size, and the timber is strong and hard; used for bandy wheels and other common purposes. A specimen of this wood supported 592 lbs. Is it the same as the Vunny marum? The botanical specimens which accompany both belonged to Prosopis spicigera.
85	Ramapullay marum.....	A medium-sized tree, frequent in the Walliar

	Spathodea arcuata. Bignoniaceæ, Icon. 1340.	jungles. I do not know the wood, but judging from its relations—Padrie and Vadencoornie—I infer it will be found good.
86	Sadachoo, or Chadachy marum. Grewia tiliæfolia. Tiliaceæ. *Damun.*	A considerable tree; the wood is soft and easily worked; useful for inferior building and common purposes; said to be unfit for cabinet purposes, for which in appearance it seems well adapted on account of its hygrometric properties, which cause it to contract and expand, however well seasoned, with every change of the weather.
87	Saudikai marum ..... Myristica cinerea. Myristiceæ. *Run jaephul.*	A tall, straight-growing tree, usually with fine clean bole; wood light-coloured, close, even-grained, apparently of fine quality.
	Sauvaudy marum	See *Vadencoornie.*
88	Segapoo shandanum marum. Pterocarpus santalinus. Leguminosæ. *Ruht chundun.*	I do not know the wood of this tree.
89	Sela yoonja marum..... Acacia odoratissima. Mimoseæ (Roxb. c. 120). *Sirrus.*	Perhaps there is some mistake in the native name. The specimens which accompany it are those of Acacia odoratissima (Curry vaugay), and may not represent the true Sela yoonja.
90	Seloopa marum ..... Elæodendron Roxburghii. Celastrineæ, iii. 71.	This tree is more remarkable for its fine form than the length and thickness of its bole. I do not know the wood, but if good can only be fit for cabinet-making and small-sized objects.
91	Sembela, or Pooli pilla. . . Cinnamomum iners nees. Laurineæ, Icon. 122, bis.	A tall tree, rather slender in proportion to its height. The wood is fine, even-grained, and supposed very good, but apparently has never been used by the carpenters here as none of them are acquainted with it.
92	Semboolinja marum	This I believe is the *Erythroxylon areolatum*

	Sethia Indica. Erythrœcyleæ, iii. 48 (Roxb. c. 88).	of Ainslie; where largest it is still but a small tree. Ainslie states that the wood is so fragrant that it is used in Mysore as a substitute for Sandalwood.
93	Sengaray marum ..... Canthium parviflorum. Rubiaceæ (Roxb. c 51).	A small tree or rather moderate shrub; wood close-grained and hard; well fitted for turning small objects.
94	Shandanum marum .... Santalum album. Santalaceæ (Roxb. c. 2). *Chundun.*	This very valuable wood is found in abundance on the hills which separate this district from Mysore, whence it is brought to Coimbatore for sale. Its uses are too well known to require notice.
95	Shayng cottay marum.... Semecarpus anacardium. Terebinthaceæ (Roxb. c. 12), Icon. 558. *Beebwa.*	The juice of this tree is so acrid that wood-cutters will not cut it until after it has been killed by ringing the bark; wood reported of no value.
96	Shem marum ..... Soymeda febrifuga. Cedrelaceæ (Roxb. c. 17). *Rheyn.*	This is another name for the Choar kullee.
97	Shemboogha marum .... Michelia Nilagirica. Magnoliaceæ, iii. 5, Icon. 938. *Peela champa.*	This tree is rare in the Walliar forest, being alpine in its tendencies; it is common on the Neilgherries; wood said to be good as regards strength, but too highly hygrometrical to be useful in other form than rafters or beams, though close and fine-grained.
98	Taita marum ..... Strychnos potatorum. Loganiaceæ (Roxb. c. 5, iii. 156). *Neermullie.*	The fruit of this is the well-known clearing nut. It forms a moderate-sized tree, but I am not aware of the wood being used.
99	Tanikai marum, or Tonda marum. Terminalia belerica. Combretaceæ, iii. 91 (Roxb. c. 198). *Yelela.*	A large tree; wood white and soft; said by Roxburgh to be durable, but not much used. In Malabar it is hollowed out for canoes, which, however, are said not to be lasting.

100	Teak marum ..... Tectona grandis. Verbenaceæ (Roxb. c. 6). *Sag.*	This is the well-known and far-famed teak. As regards strength, as shown by the weight it is capable of sustaining, it is inferior to several others tried here; the average of six specimens was about, but under 400 lbs.
101	Toarattie marum..... Capparis divaricata. Capparideæ, Icon. 889.	A small-sized tree; wood only fit for fuel.
102	Toombie marum (Ebony). Diospyros melanoxylon. Ebenaceæ (Roxb. c. 46). *Teemroo.*	A very large tree, only the very heart of which is black, all the rest white; the white wood is, however, used for common purposes.
103	Toona, or Toon marum .. Cedrela toona. Cedrelaceæ (Roxb. c. 238, Icon. 161).	A valuable timber tree, of large size; wood reddish coloured, used for cabinet-making purposes. It or an allied species is known here under the name of Wunjoolie marum, which see.
104	Tsiapangum..... Cæsalphinnia sappan. Leguminosæ (Roxb. c. 16). *Pulbung.*	Only used for dyeing. It is cultivated in Palghaut for the purpose of dyeing the straw used in mat-making.
	Ulloombul marum	*See Vadencoornie.*
105	Vadatala marum ..... Dichrostachys cinerea. Mimoseæ (Roxb. c. 174).	A small tree, or rather large shrub; wood very hard and strong, but too small for any except common purposes.
106	Vadencoornie marum .... Bignonia xylocarpa. Bignoniaceæ, Icon. 1335-36. *Khurseng.*	A large tree; wood brownish-yellow, rather close-grained; employed for cabinet-making; takes a good polish in turning.
107	Vaila marum ..... Feronia elephantum. Aurantiaceæ (Roxb. c. 141, Icon. 15). *Kowta.*	This is the wood-apple. The tree attains a large size, and the wood is hard and durable; the only specimen tried here bore 360 lbs.
108	Vaypum marum	A generally diffused tree: the wood compact

	Azadirachta Indica. Meliaceæ, Icon. 17. *Neemb.*	and durable; used for making cart-wheels, &c.
109	Veda vully marum ..... Vachellia francsiana. Mimoseæ, Icon. 300. *Eree babool.*	Deficient in size; in other respects good.
110	Vela pautherie marum ... Stereospermum chelonoides Bignoniaceæ, Icon. 1341. *Padul.*	Usually pronounced Padrie maram. The flowers are very fragrant, and the tree a very handsome one, though not large. It is probable there is some confusion in the specimens as the proper Padrie marum is reddish and this is called the White Padrie, though the specimens seem to be the same as the other. This may easily happen as the trees are very like, being principally distinguished by the colour of the flowers—yellowish in this, brownish-purple in that; hence, perhaps, the two names Black and White Pautherie. This is said to be the stronger wood of the two.
111	Vellay murdah marum .. Terminalia Berryii. Combretaceæ.	This, judging from some introduced plants growing in Coimbatore, is a very large tree; the bark is quite smooth, and nearly as green as the leaves. The wood is white, described as of ordinary quality, used on the Coast for canoes, and also for making the broad wooden platters in use among fishermen and ship lascars.
112	Vellay naga marum..... Conocarpus latifolia. Combretaceæ, Icon. 994. *Dawura.*	A tall, handsome tree, furnishing an excellent and very strong timber. The specimens tried here, though not the best, sustained 500 lbs. Roxburgh speaks of it in very high terms.
113	Vellay pootallie marum .. Sterculia urens. Byttneriaceæ (Roxb. c. 24). *Kundol.*	The wood of this very large tree is soft and loose-grained, only fit for the most common purposes. The leaves when soaked in water have the property of rendering it ropy and glutinous. The bark yields a gum resembling Gum tragacanth.

114	Vellay toarattie marum .. Capparis grandis. Capparideæ, Icon. 21.	A small treee, but the wood is close-grained and hard; too small for general use.
115	Vel vaila marum ..... Acacia leucophlæa. Mimoscæ (Roxb. c. 150).	A strong, dark-coloured wood, but generally rather small. The tree attains a medium size, with a fine round head. The bark is a pale-yellowish colour, whence the specific name Leucophlæa.
116	Vel vaugay marum ..... Acacia speciosa or flexuosa. Mimoscæ. *Sirrus.*	A common tree, frequent by road sides, on account of the shade its large head affords. The wood is white, at least as compared with the Curry vaugay, but is very strong and durable; in our trials it bore 560 lbs.
117	Vengay marum ..... Pterocarpus marsupium. Leguminosæ (Roxb. c. 116). *Beebla.* *Honee.*	A large and very beautiful tree, especially when in flower. The wood is dark-coloured and strong, sustaining a weight of 370 to 400 lbs.; but it is said to require being kept dry. It gives out to wet lime (whitewash for example) a dark, rusty-brown colour, which deteriorates it for house-building. It yields a resinous substance, which is collected in large quantities in Malabar, and sent to England under the name of Kino.
118	Ven takoo marum ..... Lagerstrœmia microcarpa. *Nana.* *Bondara.*	Another name for Cutchay cuttay, which see.
119	Vilva marum ..... Ogle marmalos. Aurantiaceæ, Icon. 16 (Roxb. c. 143). *Bel.*	Wood said to be of no value, which seems unlikely to be true, as it belongs to a family (the Orange tribe) which is remarkable for the excellence of its timber, barring its size, which is usually rather small.
120	Veppalei marum ..... Nerium antidysentericum. Apocynaceæ. *Duola kooda.*	I take this name from Ainslie, but suspect it is another name for Kooda pallei (which see), the Linnæan name belonging to a Ceylon plant which I have not seen on the continent; the wood is said to be excellent for cabinet-making purposes.

121	Vuckana marum ..... Diospyros cordifolia. Ebenaceæ (Roxb. c. 50, iii. 148).	A hard, heavy wood, colour brown; said to be very strong, but difficult to work.
122	Vunny marum ..... Prosopis spicigera. Mimoseæ (Roxb. c. 63). *Soundur.*	The specimens brought to me under this name were not in flower, but seem quite identical with those of the Purrembay. This therefore is, I believe, the Tamool, the other the Mallayalum name. The wood, if I have not mistaken the species, is very strong, sustaining nearly 600 lbs.; is hard, straight-grained, and easily worked; but it may be another name for Currengally, the folinge of which is very like that of Prosopis spicigera.
123	Woadoogoo marum ..... Cluytea colina. Euphorbiaceæ (Roxb. c. 169).	A small tree, frequent in the Walliar jungles; wood red-coloured, exceedingly hard and durable, but of small size; notwithstanding its hardness being very even-grained, it is easily worked, and is from its fine, close grain a pretty wood.
124	Wodahalay marum ..... Acacia catechu. Mimoseæ (Roxb. c. 175). *Kheir.*	Said to be only fit for fuel. This surprises me, as the woods of all the other arboreous species of the order (Mimoseæ) are proverbial for their excellence.
125	Woonja marum ..... Acacia amara. Mimoseæ (Roxb. c. 122). *Lullye.*	A pretty large tree, but of rather low stature; the wood dark-coloured and hard. I have not yet had an opportunity of properly examining it.
126	Wunjoolie marum ..... Cedrela toona. Cedrelaceæ, Icon. 161.	Very heavy, and strong, hard wood; said to be admirably fitted for pestles and mortars and other purposes demanding great strength, but not for cabinet purposes, whence I suspect Roxburgh's Toona and our Wunjoolie are different trees.
127	Yellanday marum ..... Zizyphus jujuba. Rhamnoæ, Icon. 99. *Bhur*	Tree usually of small size, but the wood fine-grained and hard, fitted for cabinet-making purposes.
128	Yetti marum	A small tree; wood white and hard; much

	Strychnos nux vomica (Roxb. c. 4). Loganiacæ, Icon. 434. *Koochla.* *Jehr katchura.*	used, when procurable, for native ploughshares.
129	Malay konjie marum ..... Cullenea excelsa. Bombaceæ, 1761. Curroongurray marum. Curroombodel marum. Vaymbadum (Ainslie). Vekkali (Ans.). Velagum (Ans.). Vuttungee (Ans.). Upucutie (Ans.).	A very large and tall tree; trunk straight, from 60 to 80 feet high; wood white, rather open-grained, apparently not very good; but the outside sap-wood only was examined. Under the microscope its longitudinal section is very peculiar,—altogether such as I have not elsewhere observed.

ADDITIONAL LIST OF WOODS.

130	Coongellega marum .... Rhus sp. Terebinthaceæ.	This is the Chloroxylon dupada of Buchanan and Ainslie. An undescribed name, and, judging from the leaves, one not required, which are clearly those of a Rhus, very nearly allied to Roxburgh's R. buckiamela, but distinct. The qualities of the timber are unknown. The outer sap-wood is white, fine grained, and heavy; apparently very good.
131	Kat miella marum	This is a large tree, frequent on the lower

	Vitex altissima. Verbenaceæ, Icon. 1466.	slopes of the ghaut mountains, but I am not acquainted with the timber except in so far as can be learned from a small outside specimen, which seems close-grained. It is reported fit for cabinet purposes.
132	Malay cauray ..... Canthium nitens. Rubiaceæ.	The wood of this, like that of the preceding, is unknown to me. The plant is described as a small tree. I only know it from the specimens which accompanied the name, but which were not accompanied with timber.
133	Yella malakai marum .... Hymenodyction obovatum, Icon. 1159. *Kurwye.*	A tree, but I am unacquainted with its dimensions, or quality of the wood, no specimens having been sent.

LIST OF WOODS PROCURABLE IN WESTERN INDIA.

SECTION II.

1	Diospyrus montana ..... Teemroo. Teemboornie.	Heart-wood, dark and strong. Fitted for agricultural implements, in-door work, &c. Does not bear exposure. Could not be creosoted. Tree very common in our larger jungles, both near the coast and elsewhere. Fruit rather palatable. It would be one of the most common of our mountain trees if allowed to grow; but it is generally cut off for burning material or such like worthless purposes.
2	Chickrassia tubularis .... Pubha. Pabha.	A fine straight-growing tree, rather common in the southern jungles, but much less so in the northern. Wood is valuable for cabinet and house purposes. It furnishes one of the *Deodars of Malabar*. Could be readily creosoted.
3	Ankool ..... Alangium decapetalum.	Tree common both in the open country and in some of the jungles towards the coast, but it is less of a jungle tree than one found in hedges and village lanes. I have never seen one that would give a 10-inch plank. Root has a reputation in snake-bites.
4	Artocarpus hirsuta ..... Pat funnus. Hebulsoo.	Is not found in our northern jungles; sparingly in those south of the Savitree, to the bounds of Sawunt Waree, after which it is found more plentifully, and continues abundant all down the coast. Wood valuable for canoes, and can bear exposure under water.
5	Odina woodier..... Mogeer.	Found in our coast jungles, but not common. I have not seen it inland. Wood is with us of no account.
6	Bauhinia parviflora..... Apta.	Wood is reckoned very strong, but is never found of a good size. Bark excellent for ropes. Leaves are extensively used for

		making "Bherees," or native cigars. Tree is found throughout our forests, both on the coast and inland.
7	Ulmus integrifolia . . . . . Wowlee.	Wood is rather good, but does not bear exposure well. Could probably be creosoted. Tree is rather common in the Konkun, but less so in jungles than near to villages and towns.
8	Givottia rottleriformis. . . . Reetha.	Found only in a very few of our Bombay jungles, and in these only inland above the Ghauts. Not seen in Gujarat. The wood is light, and, in as far as I know, used only for making the figures and models manufactured at Gokak, in the Southern Maratha Country.
9	Bauhinia variegata . . . . . B. tomentosa. Kunchun.	The former of these is sparingly found in our forests, and never reaches a size fit for a 10-inch plank. Wood is hard and good. Bauhinia tomentosa I have never seen in our forests.
10	Lagerstrœmia reginæ . . . . Mota bondara.	Timber is reckoned rather good, and is used (being generally crooked) for the knees, &c. of native boats. It is common in the jungles below the Ghauts south of the Savitree river; hardly found north of that, and never in the inland jungles.
11	Terminalia belerica . . . . . Yehela. Berda.	A large and fine-looking tree, found in all our jungles, both on the sea-board and in the interior. Wood is worthless for building houses and canoes, as it is very readily attacked by worms.
12	Swietenia febrifuga . . . . . Rheyn.	The wood is reckoned strong, and good for indoor purposes, but not adapted to those requiring exposure to sun and weather. The tree is chiefly found in the northern forests, and is more common in those inland (as about the Satpoora Hills) than in the coast forests. The wood is chiefly used for cabinet purposes. The bark is deemed (as the name implies) to have some virtue as a remedy in fevers.

13	Gmelina arborea ..... Shewun.	A large tree, not very common; found more in the forests below the Ghauts than inland. The wood is in much esteem for carriage pannels and other purposes. According to Dr. Roxburgh, it also stands exposure to weather and water well. From its great size, straightness, and general spaciousness in appearance (being a beautiful flowering tree), this is one of the most desirable for propagation throughout the country.
14	Putranjiva Roxburghii .. Jeewunpootr.	It is not common as a forest tree with us, and is found only in the coast jungles. I have never seen it of any size, but the wood appears hard, strong, and durable. It is a good wood for turning.
15	Acacia sundra ..... Lal kheir.	Is common in the inland jungles with us, but is there always scrubby, small, and crooked. It is also found rather plentifully in the forests under the Ghauts, but I have not there seen it of any size capable of affording planks.
16	Terminalia glabra ..... Penlaptera glabra. Aeen. Mairtee.	Is the well-known Aeen, found most abundantly in all our coast jungles, and also in those above the Ghauts. Valuable for house-building and many other purposes. The wood burned appears to yield very pure lime.
17	Garuga pinnata ..... Kooruk.	Common in our jungles. Wood appears of little value; might be creosoted.
18	Acacia odoratissima..... Sirrus.	There appears no difference between Acacia sirrus and the present species. The white wood, which is always three-fourths of the whole, could probably, by being creosoted, form a useful railway timber. Tree is common both in the coast and interior jungles; often reaches a good size.
19	Acacia Arabica ..... Babool.	Most common in the interior; less so on the coast, and hardly known in the southern jungles. As every one is acquainted with its uses for wheels, charcoal, &c. these need

		not be enlarged on here. There are two if not three varieties or species—*Babool, Ram kanta,* and *Eree babool.* The first is the most common species; the second less so, and distinguished from the first by its straight stem and general appearance, resembling that of a gigantic broom. The wood is quite equal to that of the common Babool. The third species is distinguishable from the first by its more horizontal mode of branching; the smaller branches long, and stretched out, the side branchicles from them going off at right angles nearly. The bark also is much more reticulated, broken, and corky than that of the other. The wood is very inferior as regards its use for agricultural implements, house material, &c. The distinction between the two should always be kept in view as practically important. The pod of this third species also is much broader-margined, and very partially moniliform, and can be at once distinguished from that of the first two species, which is so contracted between each seed as to be nearly severed. The pods and tender branches of all the three species form an important article of food for sheep, goats, and cattle from February to the beginning of the rains. The flesh of lambs fed on the pods has a flavour equal to that of the best Europe lamb.
20	Lagerstrœmia microcarpa. . Nanah. Bondara. Benteak of Malabar.	I think Dr. Wight underrates the quality of this wood. It is very fit for many household purposes, and for the decks of ships, &c. It is very common in our forests, but less so to the north of the Savitree than to the south of that river. It is much used in the Dockyard, which forms a good presumptive proof that the wood cannot be very inferior.
21	Dalbergia sissoides	I do not recognise this as being with us a species distinct from Dalbergia latifolia, of which, as well as of D. sissoo, notice will be taken hereafter.

22	Ficus tsiela ..... Datira.	Timber not of any account; rather common in the ravines of the Ghauts, but not in open forest land.
23	Eriodendron anfractuosum. Shameula.	Not common, save in some parts of Khandeish. Wood is worthless.
24	Bassia latifolia ..... B. longifolia. Mhowa.	The first of these is common in all our jungles, both on the coast and above the Ghauts; the latter I have not seen north of the Goa border. The uses of the flower and fruit being well known need not be enlarged on here. The wood, particularly the large logs brought from the Barria forest and Kupperwunje hills, is extensively used for house and cart purposes in Gujarat, but seldom appears in the market in Bombay or elsewhere. It appears strong and tough.
25	Dalbergia latifolia ..... Seesoo. Seesum.	Is rather common in most of our coast forests, particularly in ravines of the hills and under the Ghauts, also on the Ghauts; but with us it never reaches the great size which it attains in Malabar. It is also often crooked. The wood is extensively used for cabinet-work, knees of vessels, agricultural implements, combs, &c. It appears, in density of grain and endurance, much superior to the Sissoo of Hindoostan.
26	Inga xylocarpa ..... Jamba. *Yerool* (Canarese).	Is not uncommon in our sea-board forests south of Panwell, but not to the north. It never with us seems to grow straight to any size, so that it could be applied to house or ship-building. The wood is of a superior quality, and in the Madras province of North Canara is most abundant, particularly between Sircee and Yelapore.
27	Euphorbia tirucalli ..... Seyr. Teg. Unarmed milkbush.	The wood of this, when mature, is reckoned very strong, and durable when not exposed to wet. It is extensively used, whenever procurable, as a dunnage material for the flat roofs of houses. It is sufficiently close-grained to be useful to turners. Could,

		I think, be readily creosoted, but is very seldom of scantling sufficient for sleepers.
28	Atalantia monophylla .... Makur limbo.	Is one of the most common trees in our green-wood jungles or Raees about the Ghauts; less common below and inland. The wood has the qualities ascribed to it by Dr. Wight, but is never procurable in pieces which would square more than four inches.
29	Limonia alata (?).... ...	Is found only in our southern Ghaut forests, above and below. The wood has all the qualities attributed to it by Dr. Wight. It is not a common tree.
30	Casearia elliptica ..... Bhogara.	A small tree, not uncommon near the Ghauts, much less so elsewhere. It is too small for timber purposes, but a distinct species, which may be seen growing at Darebae Wurgaum, on the horse road from Jooneer to Nuggur, is of a size fit for house-building. I have not seen this species elsewhere.
31	Cassia fistula ..... Bawa. Baya. Gurmala.	Common in our forests on the sea-board as well as above the Ghauts. It is one of the last trees which lingers in a country recently cleared. The wood is of moderate strength, but very liable to crack after drying. The pods form a small article of commerce.
32	Ziziphus œnoplia (?)	This shrub I have never seen but as a climber. The bark affords a good deal of kino.
33	Eugenia jambolana ..... Jambool.	Found in all our Ghaut and coast forests; also pretty extensively near villages, when it has been planted. I think Dr. Wight underrates the quality of the wood. It makes excellent beams, but on account probably of its brittleness is never cut up for cabinet purposes. The bark affords a large supply of kino extract.
34	Chloroxylon swietenia .... Satinwood. Hulda.	With us I have never seen it reach beyond the size of a small tree, which when straight (seldom the case) would afford a log squaring three inches. It is rare, being, in as

		far as I have seen, found only in the Padshapoor jungles and in those of the upper Mool in the Ahmednuggur collectorate. In the coast forests I have never seen it. The wood is heavy and strong, and reckoned very excellent for pieces of agricultural implements. I have not seen it used in cabinet-work in the Bombay territory.
35	Premna tomentosa..... Chumbara.	I have not seen the wood of this small tree brought into use for any purpose. It is found, but is not common, in and about the Ghauts.
36	Holarrhena	I have not found this tree in our jungles, therefore cannot speak of it.
37	Gmelina Asiatica..... Kanta. Shewun.	This shrub I have not seen put to any use excepting as a part of a fence.
38	Ziziphus glabrata ..... Ran bor.	Wood close-grained and good. Bark affords a quantity of kino-like gum, both by exudation and by decoction. The tree is most common in cultivated lands and in alluvial soil on the banks of rivers. It is less common on the coast than inland.
39	Mangifera Indica ..... Amb.	A very serviceable wood for plank when not exposed to wet. It is much used for house purposes, much less for carts. It seems to bear the action of salt-water better than that of fresh; hence is used for canoes. Could be readily creosoted.
40	Mimusops elengi..... Bukool.	Mostly found as a cultivated tree; more rarely wild, and then only below the Ghauts. I have used the wood for cart shafts, and found it strong and rather durable.
41	Melia azadirachta ..... Neem.	The Garden Neem; our Melia sempervirens I take to be the one here meant. The wood is worthless, except for cabinet-work, for which it is fitted by its colour and grain.
42	Bauhinia acuminata	Two species appear to be mixed up here, viz.

	Duola kunchun.	Bauhinia albiflora, which reaches a fair size, and B. acuminata, which is a small shrub, of no account as a wood. That of the first species is of good quality, but seldom of scantling sufficient for cabinet and house purposes. The other appears too small to be turned to any purpose of utility. B. alba is found in forests on the coast, but rarely. It is more common in the vicinity of villages. B. acuminata I have not met with except as a cultivated species. It seems not to be indigenous with us.
43	Terminalia alata (?) ..... Penlaptera paniculata. Keenjul (?).	I believe that our Keenjul is here meant. It is common to the south, but not known to the northward. Wood is equal to the common Aeen. The *Aurora* cruiser was built of this wood.
44	Randia dumetorum ..... Gehela.	One of the most common trees in all our forests, but the wood never reaches any size. It is strong and hard.
45	Cratœva Roxburghii .... Kurwan. Koomla (?).	Not a common tree. I have not seen it in forests. The wood is white, and (I believe) one of those used for the purposes of the turner.
46	Briedelia spinosa ..... Asun. Asanna.	Rather a common tree in our forests, both coast and inland. The wood is strong and tough. Stands the action of water well; hence it is often used for the frames of wells, whereon the superstructure of masonry is erected. This wood deserves, in my opinion, to be more extensively known than it is. It is also used as beams for houses.
47	Premna integrifolia ... Chamaree.	The remarks made in regard to No. 35 apply here. The shrub is rare, save about the Ghaut heads.
48	Erythrina Indica ..... Pangura. E. suberosa. Ran pangura.	A common tree in all parts of the country, but more so on the coast. Its place in the forests is generally taken by Erythrina suberosa. I am not aware that it is applied to any purpose except the making of sword-

		scabbards. For these it is a first-rate material, and may be exported to Europe so soon as the eyes of the military public shall have been sufficiently opened to the necessity of sacrificing clank and shine to utility in the matter of sword-scabbards.
49	Nauclea cordifolia. ..... Hedoo.	A common tree in our coast forests; straight, and of large size. Never found inland. The wood is most extensively used for all purposes of planking in in-door work. Painted, it appears to stand exposure to the weather for years. Could probably be creosoted to advantage.
50	Morinda citrifolia ..... Al. Bartondie.	Not a common tree in our forests; more common about villages. The wood makes tolerable plank, but appears never to be used, except for door-shutters and such like.
51	Hydrocarpus inebrians .. Kowtee.	The wood is not used for any purpose. The seeds of the fruit afford an oil. The tree is hardly found in our northern jungles on the coast; more frequently in those south of the Savitree river.
52	Ehretia ovalifolia..... Gundun.	The tree is found about towns, never in forests. The wood is of no account.
53	Cordia Rothii, &c. ..... Bokur.	The different species or varities noticed here do none of them give a timber fit for anything but firewood. They are not uncommon in the forests, but are more generally met with near cultivated lands and villages.
54	Terminalia catappa ..... Bengali badam. Bengal almond.	This tree is not indigenous to the Bombay Presidency, but is common in the gardens of Europeans and natives. The wood does not appear to me to be of average quality or fit either for domestic or public purposes, excepting for firewood.
55	Eugenia caryophyllata.... Rat jambool.	Is hardly found north of the Savitree. South of that river it is found only in Raees or green-wood jungles, and about temples. The wood appears quite equal to that of the common Jambool.

56	Nauclea parviflora ..... Kuddum.	Rather a common tree in the coast forests; less so inland. Is found, however, in quantities in the dells above the Ghauts. The wood is reddish-coloured, close-grained, and rather valuable for gun-stocks, in the making of which it is chiefly used. This wood could not be easily creosoted.
57	Antidesma alexiteria (?) ..	A small tree, not common in our forests. Affects rather the skirts of cultivated land. It never reaches a size sufficient to render it fit for purposes of carpentry.
58	Morinda citrifolia ..... Bartondie.	*See* No. 50 above. No remarks need be added.
59	Guatteria cerasoides .... Hoom.	A tree common in our coast and Ghaut forests; less so inland. May be easily recognised by its great straightness, and handsome appearance. Wood is useful in carpentry, as well as for naval purposes, as boat-masts, small spars, &c. It is reddish and close-grained.
60	Gardenia turgida..... G. montana (?).	I do not recognise this species or variety; neither do I find it noticed in Dr. Wight's Prodmomus. If it be our Gardenia montana, the tree is rather common in the coast and inland jungles. It may be recognised by its straight stem, long, stout thorns, and general absence of leaves. The wood is hard, but always small, never squaring to more than 3 inches.
61	Bahunia [illegible] Egyptiaca . . . Hingon Mr.	Tree common in waste places rather than in forests. Wood small, and otherwise worthless, decaying rapidly.
62	Tectona grandis . . . . . Teak. Sagwan.	*Vide* remarks under No. 100.
63	[illegible]ospermum suaveolens. Pâpri. Tungul.	A tree very rarely found in our forests. May occasionally be seen in the Konkun near a temple; evidently planted for the sake of its beautiful flowers. It abounds in the

		Soonda forest. The wood is strong and serviceable.
64	Artocarpus integrifolia .. Funnus.	Is with us common only about villages. Rare in the North Konkun, but most common south of the Savitree Creek. It is always planted, and often carefully manured. Under these circumstances it attains a great size. I have seen pillars of it in the interior of the buildings of the old forts at Severndroog and Rutnagherry, having 4 feet on each side.
65	Careya arborea..... Koombha. Wae koombha.	A tree very common both in our inland and coast jungles. It is said to stand the action of water well, but the wood does not seem to be much used. From its being generally crooked, it may be worthy a trial for the crooked timbers of boats, cornering of carriages, &c. It is employed in the upper frame-work of wells. The bark furnishes slow-match for matchlocks.
66	Wrightia tinctoria ..... Kala kooda.	A small tree, very common in all our forests. Wood close-grained and white, as described by Dr. Wight. Leaves are said to afford an indigo ; hence the name. It is extracted by scalding.
67	Bignonia Indica ..... Tetoo.	Common near water streams, chiefly below the Ghauts. Wood is of no value, neither does it ever reach any size.
68	Garcinia glutinifera.....	I believe that a Dyospyros must be here meant. It may be that our Garcinia sylvestris is alluded to. If so, the tree is one common in the Southern Konkun, Malabar, and Canara (always planted), affording a good wood and palatable fruit, from the kernel whereof is extracted by boiling the vegetable concrete oil "kokum." The dried fruit is a common ingredient in native cookery, having an agreeable acid.
69	Borassus flabelliformis.... Tar.	Is with us common only in the Northern Konkun, in some parts of which, *especially near*

	Palmyra.	the sea, it is so abundant that it might be termed forest. The wood, protected from moisture, is very strong and durable, and hence may be used with advantage as roofing for terraces, &c. when the upper covering is complete. It is a rare tree in the southern jungles of the Presidency.
70	Hymenodyction utile .... Kurwye.	I cannot learn that the wood of this tree is ever used except for firewood. The tree is common enough, in rocky slopes mostly, in or near thick forest. It does not stretch inland beyond the limits of the Ghaut ravines.
71	Ailanthus excelsa..... Marook.	This tree is common, chiefly about old buildings, and in raviny ground of the Deccan and Gujarat. It is seldom found as a tree in the forest. I cannot confirm the accounts given by Dr. Wight of its good qualities, neither can I learn that it is ever used in cabinet-work in Bombay; but I give these opinions with diffidence, and in the view of inviting further trials or more information.
72	Terminalia chebula ..... Heerda.	With us in jungles more rare than on high table-lands, on and near the Ghauts. The wood is strong, and rather hard, but on this side of India does not reach any great size, and is generally gnarled, owing to the exposed situations in which it grows. I am of opinion that in describing it as a most gigantic tree, Dr. Wight must have confounded the wood of Terminalia bellerica with that of this tree.
73	Calophyllum inophyllum .. Oondie.	Common on the coast, growing on sandy sheltered spots close to the sea on the coast south of the Savitree. North of that river [illegible] Varer. The wood never reaches any [illegible], and is always crooked. A good bitter [illegible] furnished by the seeds. To the best of my knowledge, the Poon spars are furnished by Calophyllum Angustifolium, which is a magnificent tree in the ravines of the Southern Ghauts. In habit and appearance it is totally distinct from this species. These

		spars are found along the Ghauts, from the Sawunt Waree border southward, but rarely of any great size till the line of the Neelcoond Ghaut is passed.
74	Dillenia pentagyna ..... Kurmul.	A great tree, common in the Konkun and Ghaut jungles; never found inland. I do not find that the wood is used for any purpose more important than for the loose planks used in the decks of native boats. It is not employed in house purposes.
75	Sapindus emarginatus.... Areeta.	This tree is often found planted, near Mussulman buildings especially, but is, to the best of my knowledge, not indigenous in our forests. I have not seen the wood used for any purpose except fuel, but information is wanted regarding it.
76	Bombax Malabaricum.... Saeer. Saeree. Kanta saeer.	One of the most common trees in our forests, both of the coast and inland. Reaches a great size. The planks are extensively used in making the light packing-boxes used in the export of bulky goods from Bombay and other places; also for fishermen's floats when the Adansonia is not at hand.
77	Tamarindus Indica ..... Cheetz. Umlie.	Is not a tree common in forests, but very much so near old temples, gardens, &c., where it has been long ago planted. The heart-wood is very strong and durable, but carpenters are very unwilling to work it up, on account of the great damage it causes to the best tempered tools.
78	Pongamia glabra..... Kurunj.	Of this wood I cannot speak from experience, but from its look I think it may be of some use for household purposes. The tree is common in forests chiefly, near and under the Ghauts, and will generally be found skirting streams. The bitter oil is much used in the manufacture of native felt, and has great curative powers in itch and mange.
79	Thespesia populnea..... Bendie.	This tree is found only on our coasts and in districts near the coast. It seems to

		have been introduced from the Eastern Islands by the Portuguese. The ripe timber is very strong and durable, with a colour like Mahogany. It is much used in the construction of cart-wheels and the timbers of native boats. The shoots are also in extensive use as rafters for houses, and at all times fetch a good price when sold for this purpose. It is, as Dr. Wight observes, very difficult to find an old tree not hollow and decayed. Government have now an extensive Bendee plantation at Sakuria, in Alibagh, and at Sat Tar. The tree grows most readily from cuttings.
80	Schleuchera trijuga..... Kusoomb.	The wood has all the good qualities described by Dr. Wight, but with us it reaches a size so large that it is used for making screw rollers for sugar-mills, cotton-presses, &c. The tree is common in the forests of the North Konkun, but less so in those of the Southern Konkun.
81	Nephelium longanum.... Woomb.	This tree is confined to our Races or green-wood jungles in and below the Ghauts. It is never used, in as far as I have seen, either by the carpenter or the agriculturist. In fact it is too rare to be so.
82	Butea frondosa ..... Pulus.	The tree is common in forests—more so in those inland than on the coast. In the former localities, especially in Gujarat, it may be seen covering almost the whole of the uncultivated country. The wood appears to be little used in the Konkun and other southern countries; but in Gujarat (where it is called Bastard Teak) it is extensively employed for house purposes, and from what I have seen of it, I deem that it is both durable and strong-grained. The roots afford a strong rope, and the beautiful red exudation forms one of the gum kinos of commerce. The flowers give a bright-yellow dye.
83	Dalbergia paniculata	A tree rather common in most of the forests,

	Phassee.	both of the coast and inland. The wood is light-yellow, strong, compact, and fit for many purposes in house-building, agriculture, &c.
84	Prosopis spicigera ..... Soundur.	A tree common both in waste places and forests. With us it never reaches a size which would afford a square log of more than 9 inches on each side. In Sind, where it is common, it reaches a large size. The heart-wood is very strong, tough, and dark-coloured. In Sind it is commonly used for weavers' shuttles. This is the chief tree worshipped at the Dusera festival.
85	Spathodea arcuata ..... Mersingee.	A tree common in the coast forests, but not (I think) found at any distance inland above the Ghauts. The wood is white, compact, and strong. It is, I believe, used by the turner.
86	Grewia tiliæfolia ..... Damun.	This is a common forest tree in the coast jungles; rare inland. The wood is not of any value for household purposes, agricultural implements, or cabinet-work. The bark gives a strong rope.
87	Myristica cinerea..... Ran jaephul.	A great and straight tree, found in green-wood jungles or Raees above and below the Ghauts. It is not sufficiently common, nor found generally in situations easy of access, so as to allow of its being used for household or agricultural purposes. The wood is white and compact.
88	Pterocarpus santalinus .. Rukt chundun.	Of the qualities of the wood of this tree, not indigenous with us, but found in Malabar, I cannot speak from personal experience, and I will be glad to be furnished with further information.
89	Acacia odoratissima..... Ran sirrus.	I do not think there is any foundation for a distinction between this tree and the Acacia serissa. It is common in our forests, both coast and inland. The heart-wood is strong

		and excellent, but does not, I think, bear moisture. (*Vide* No. 18).
90	Elæodendon Roxburghii.. Bootkus.	I have never seen this tree, which is more common in the inland than in the coast forests, of a size fit for timber. The wood is strong and compact.
91	Cinnamomum iners..... Ran dalcheenee.	The tree is found only in our Ghaut forests, chiefly to the south. The wood is rather strong, but is little used in house-building, or for implements.
92	Sethia Indica	This tree I have never seen. It is not found in our forests.
93	Canthium parviflorum....	A small shrub, found on many of the barren wastes of the Deccan and on hill ridges. I have never seen it of a size sufficient for any economical purpose.
94	Santalum Album ..... Chundun.	Appears to grow wild anywhere with us, and may be seen in quantities in waste gardens, and even in some of our grass preserves. It is said the wood has not the high qualities of that found in the more southern provinces. In the Dharwar collectorate there are about 153,000 trees—a number which much exceeds that found in the whole length and breadth of our more northern provinces. From the facility with which the tree is raised, and the great abundance of the seed which it furnishes, I am of opinion that its extension should be kept in view. The objection taken, as to the inferiority of the wood, I do not look on as well founded.
95	Semecarpus anacardium.. Beebwa.	The tree is common rather in the skirts of than in forests, where its place is taken by another species, Semecarpus cuneiformis. The wood is not of any value, but might be turned to some account by being creosoted, which the openness of its fibres would admit of its being.
96	Soymida febrifuga ..... Rheyn.	*Vide* No. 12. No remarks need be added here.

97	Michelia Nilgirica ..... Michelia champaca. Peela champa.	This tree I have not seen wild in forests. In gardens and about dwellings it is common. The wood is straight, and moderately close in grain. It could be turned to account in house-building, and might with advantage be creosoted, but it is not sufficiently common to be extensively used.
98	Strychnos potatorum .... Neermullie.	Is with us found only in a few localities. I have seen it in the hills of Satpoora range near Arrawad, and in the jungles of Doodi, on the Gutpurba.
99	Terminalia bellerica..... Berda. Yehela.	Is one of the largest trees in the forest. Found abundantly both in the inland and coast jungles. Although straight and of great scantling, it is quite useless as a building timber, being immediately attacked by worms. (*Vide* No. II.)
100	Teak..... Tectona grandis. Sagwan. Saya.	The representative of the oak in India. In strength it is, as Dr. Wight observes, inferior to some other trees, of which Dalbergia Oojenenis or Tunnach may be mentioned as one. In general qualities however, and especially in endurance under exposure, it seems superior to all other Indian woods. Differences in quality, according to latitude, soil, or situation, are very observable. It is commonly said that northern Teak is superior to that of Canara; that this again is of greater strength and endurance than the Malabar wood; and that the Teak of Pegu is the worst of all. For this distinction there is some foundation, but I think by no means to the extent named. I have seen some Teak, grown in the richer valleys of the Northern Dang, inferior in strength and compactness of grain to that imported from the inland hilly parts of the southern peninsula, as the Annamala forest, situated between Coimbatore and Malabar. There is, however, no doubt but that the eastern Teak, from Salven and other rivers, is considerably inferior in strength and durability to that of Malabar.

101	Capparis divaricata ..... Pachounda.	If I am right in divining the species alluded to by Dr. Wight, here is a tree not uncommon in the more arid wastes and dry hedges of the interior. I have not seen it applied to any use excepting for firewood.
102	Diospyros melanoxylon .. Abnoos.	The Ebony tree. I have not seen it in any of the Bombay forests. It is found sparingly in those of North Canara, as below the Woolwa Ghaut, and near Meerjan, inland.
103	Cedrela toona ..... Kooruk.	Not a common tree in our forests, but found in some of the greenwood jungles about the Ghauts, and also in the hill range abutting on the Rajpooree Creek to the south. The wood is a choice one for cabinet purposes, but is not used for any others, except for house beams, when it is procurable in quantity sufficient. In the Races of the South Konkun and Lower Canara the tree is more common. It is, in as far as I am aware, never found inland.
104	Cæsalphinnia sappan .... Puttung.	Tree not indigenous with us. It is, however, imported in quantity from the Palghaut jungles (?) for dyeing purposes. It grows freely in our cultivated places without any care, but I remark that the heart-wood is dingy, and wants that fine pinkish-red which the imports from the southern forest have.
105	Dichrostachys cinerea (?).	A small scrubby tree, common in waste places of the inland country; I have not seen it near to the coast. The wood is good for pegs, but too small for any other purpose.
106	Bignonia xylocarpa..... Khurseng.	Common in forests both inland and on the coast. May be easily distinguished by its peculiar rough pods, 2 feet or more in length. The wood is good if ripe. It also affords an oil, obtained by a simple process of reverse distillation, and said to be of great efficacy in cutaneous affections.
107	Feronia elephantum	The tree is most common in inland jungles,

	Kowith. Kowta.	but grows well everywhere. In Gujarat it attains a good size. The wood is used in building, and could probably be creosoted so as to bear exposure.
108	Azadirachta Indica ..... Neem.	Found in considerable abundance in most parts of the inland country; more seldom as a forest tree than in waste places. In bare districts the wood is of great importance for building and agricultural purposes. The leaves and bark are also highly medicinal. This is one of the trees which it would be important to increase throughout the country. It reaches a large size even in stony ground.
109	Acacia Farnesiana ..... Eree babool. N.B.—This latter name is also applied to the second species, a variety of Acacia Arabica.	A scrubby shrub, found in waste places, garden hedges, &c. It is not applicable to any other purpose than tent-pegs and firewood.
110	Stereospermum chelonoides Padul.	I have never seen any reason for the opinion of Dr. Wight as to there being two varieties. We certainly have only one, bearing beautiful fragrant pinkish flowers. The tree is not common in forests, but is found especially in those of the coast and Ghauts. I have not seen it in the inland jungles. The wood is good for interior building, but seldom procurable of a size fit for anything but posts.
111	Terminalia Berryii	This tree is not indigenous with us, neither are there as yet any specimens of it in the Botanical Gardens.
112	Conocarpus latifolia..... Dawura.	Varies in size from a scrubby shrub to a great tree, according to soil and situation. Seems to be as common in the inland forests as it is in those of the coast. The wood is well described by Dr. Wight as very strong. It is also tough, and hence is much in use for the wooden axles of carts. It is much used in agriculture and house-building. This

		also is one of the trees which should be largely increased.
113	Stereulia urens..... Kundol.	The tree is common, both in inland and coast forests. May be always recognised by its peculiar bark, looking as if painted a light pink. Wood is worthless. Leaves and tender branches of great use in certain cattle diseases.
114	Capparis grandis (?)..... Our C. brevispina? Waghutty.	Common in waste places inland. Wood hard, and good for turning.
115	Acacia leucophlæa ..... Hewur (?).	I think this species embraces also our Mimosa tomentosa—at least I have never found another to fit the former name. Wood is good, but never of a size for anything beyond posts to small houses.
116	Acacia speciosa ..... Sirrus.	*Vide* remark in No. 89. *Vide* also No. 18.
117	Pterocarpus marsupium .. Bcebla. Honee.	Not common in our forests, but most so in the northern inland ones, and also in those of the extreme south, as in the Bedee Talooka. Reaches a great size, and the wood is much used in house-building. It does not stand exposure to wet.
118	Lagerstrœmia microcarpa . Nana. Bondara. Benteak.	*Vide* remarks already made under No. 20.
119	Ogle marmelos..... Bel.	Tree common in waste places, inland forests, and old gardens. Wood compact and hard, but is not used, more perhaps from religious feeling than anything else. The beautiful ready-made varnish which surrounds the seeds will one day be turned to use in the arts. The fruit is strongly medicinal.
120	Nerium antidysentericum . Duola kooda.	A very common shrub in waste places and on hills all over the South Konkun. Less so in the North Konkun and interior, but still

		common. The wood is hard, and fit for the turner. It never reaches a size sufficient to render it fit for the carpenter. Experiments on the bark of this tree are sadly wanted with us.
121	Diospyros cordifolia..... Goundun.	Not uncommon, but more in ravines and waste places than in forests. I have never seen a tree that would turn out a log 4 inches square. The wood is strong and durable.
122	Prosopis spicigera ..... Soundur.	*Vide* remarks already made in No. 84.
123	Cluytea colina	This tree is not found, in as far as I have seen, within our limits.
124	Acacia catechu..... Kheir.	Is one of the most common trees in the coast and Ghaut jungles. Wood is of great strength and durability. Resists insects; therefore is used for posts and uprights of houses. The extract "catechu" is made from the heart-wood, and is the source of a small revenue in the Konkun. The tax is so much per "hearth," containing about 24 pots.
125	Acacia amara ..... Lullye.	A tree common in the more inland jungles and dry waste ravines; less so on the coasts. Wood is always very crooked; otherwise it is strong, and might be applicable to domestic purposes. The flower is very beautiful.
126	Cedrela toona	*Vide* description already given in No. 103.
127	Zizyphus jujuba ..... Bor. Bher.	I have failed to find any specific difference between the wild and this the more cultivated species; therefore the remarks made in No. 38 may apply here. The wood often reaches a large size, fit for planks or sleepers, for which latter it might, in the dry climate of Sind (where the tree is common), answer well. Ziziphus xylocarpa (Gol Bor) is another species, which makes excellent torches, but is fit for no other use.

128	Strychnos nux vomica . . . Jehr katchura.	Common in the South Konkun, particularly in shady ravines. Does not appear north of the Savitree or inland. The wood is reckoned of average quality, and could readily (to all appearance) be creosoted.
129	Cullenia excelsa	I have not met with this tree within our bounds.
130	Rhus Buckiamela	Not found with us. The chief representative of this tribe in our barren hills is Rhus Mysorensis, a scrubby shrub, fit only for firewood.
131	Vitex altissima (?)	I am not sure as to the species which Dr. Wight had in his eye when he remarked on this. We have two varieties of the tree: from the first, Vitex leucoxylon, not uncommon by the edges of streams in the South Konkun and the Ghaut jungles; the other Vitex alata; rare. Both have a white compact wood, apparently good for turning, as well as for cabinet-work.
132	Canthium nitens . . . . . . Our C. didymum ? Canthium umbellatum (Wight).	If I am right in this conjecture, the tree is a common one on our Ghauts, and, from its flowers and shining leaves, well worthy a place in gardens. The wood is small, and not put to any use.
133	Hymenodyction obovatum. Kurwye.	The remarks made in No. 70 apply here. We have the two species, but the wood of neither is fit for anything but fuel.
134	Memecylon tinctorium . . Kurpa. Anjuna.	A tree of rather a small size; common on the Ghauts above; not seen elsewhere. Wood is very strong and tough. Does not yield readily to wet. Is much employed, when procurable of sufficient size, for agricultural implements, cart-furnishing, &c.
135	Hardwickia binata . . . . . . Anjun.	I have seen this tree only in some parts of Khandeish, and in the Padshapoor jungles. The wood is darkish coloured, close-grained, very strong, and serviceable. As the shoots grow up very straight, it is also valuable for rafters.

136	Mimusops hexandra .... Keernee.	This tree is common in Gujarat, where it reaches a great size. It is seldom found in our forests. The wood is rather strong, and much used for well-frames in Gujarat. I have not seen it used elsewhere. Fruit is nutritious and palatable.
137	Caryota urens ..... Ghaut Palm. Mhar. Phœnix sylvestris. Sindee. Wild Date-palm.	I mention both of these under one head because the trunks, freed from the inner pith, are chiefly used as convenient and economical water conduits. The latter is also most extensively used for the formation of embankments, temporary bridges, and piers. The wood of No. 1 (I mean that outside the pith) is nearly as hard as flint, of which indeed, like all the grapes and palms, it contains a considerable quantity.
138	Bignonia undulata ..... Rukt rora. Khew (of Sind).	This tree is found very rarely in our forests. I have only as yet ascertained its existence in the northern parts of Baglan, in Khandeish; in Sind it is more common in some of the valleys of the Pubb Hills and at Shah Bilawul. The wood is reckoned very strong and durable, but from its size, applicable only to small purposes.
139	Bignonia quadrilocularis.. Wurrus.	Tree found only in the higher hilly places of the Konkun and about the Ghauts. Flower very beautiful. Wood is reckoned strong and serviceable, both for beams and for planks. It is much used as planking for carts.
140	Symplocos racemosa .... Hoora.	Found only in the jungles of the highest Ghauts. Yellowish wood, but appears strong and compact. It might be used in cabinet-work, as well as for other purposes.
141	Carallia integrifolia..... Phunsee.	A handsome tree, pretty frequent in the forests of the South Konkun; not seen elsewhere. Wood hard, close-grained, and might be used in turning. It is seldom large enough for any other purpose.
142	Trophis aspera..... Kurrera.	More common in Gujarat than in other parts of the country. It is rare in forests. Wood

		is reckoned of good quality for small purposes. It will seldom be found to square above 4 inches.
143	Chrysophyllum acuminatum. Tarsee phul. Sapolaceæ in Gutta Percha family.	Of this tree I have only heard as existing in some of the Ghaut jungles of our Southern Konkun, but have never seen it except in the Upper Canara and Soonda forests, where it is rather common. The wood seems straight and good, but the tree is chiefly noticeable from the Gutta Percha-like incrustation common on the fruit.
144	Melia superba ..... Neembara.	A great tree, not uncommon in the Konkun jungles, but not seen elsewhere, except occasionally in Gujarat. Used in the making of frames for native drums. The wood is of good quality, but inferior in strength and durability to that of Azadirachta Indica, the common or mountain Neem.
145	Melia bukaen ..... Bukkun.	Differs from the foregoing in several respects. I have seen it only in the upper country. Though very similar to the last in leaf and general appearance, the smoothness of the bark and smaller size of the fruit at once indicate a distinction. The tree is found only about cultivated holdings. The wood is very strong and valuable for beams, roof-dunnage for terraces, and many other purposes. It has also the useful property of shooting from the root when once cut down with as much vigour as teak does. It is a tree deserving of extensive increase.
146	Cupania canescens ..... Amba kurb.	Tree common in the upper Ghaut jungles. Wood of average quality, but does not bear exposure. I have not seen it elsewhere.
147	Rottleria tinctoria ..... Sendree.	A tree common both in the inland and coast jungles. Wood is of fair quality when not exposed to wet. It is not readily attacked by worms.
148	Buchanania latifolia .... Char.	A straight-growing tree, and wood rather strong. It is more common in the inland

	Charolee. Char.	than in the coast jungles. Is seldom found of thickness more than sufficient for posts. Fruit tastes like an almond, and affords a fine oil.
149	Mesua ferrea ..... Nag champa. Pynaroo (?) Malabar name of a second species.	Tree never reaches any great diameter, but the wood is very strong and tough. I have not seen it in forests, but much about villages and Brahmins' gardens to the south. The latter species gives one of the finest woods I have seen.
150	Salvadora Persica ..... Peeloo.	I am inclined to think that the wood of this tree is well worthy of more extended trial, as it seems rather strong and of compact grain. It is not a tree common on this side of India Proper, except at Mussulman durgahs and places of worship; also wild on the coast in the Hubshee's Country and in the Southern Maratha Country, and seldom reaches any size. In Sind it is more common, and grows considerably larger.
151	Pentaptera arjuna ..... Arjun. Sadura. White Acen.	A forest tree, rare in the North but very common in the South Konkun from Ramghur southward. It is always found in the vicinity of streams and rivers. Reaches a very large size, and is esteemed equal to the Black Acen, though the rapidity of its growth would hardly countenance this opinion. The bark is justly celebrated as an application to wounds.
152	Jambosa salicifolia ..... Pan jambool.	A crooked species of Jambool, growing much in the rivers of the Deccan country and Konkun. The stem is generally useless for house purposes on account of its crookedness, but the straight shoots are eagerly sought after as rafters.
153	Olea dioica ..... Par jamb. Karambu.	A tree common on the Ghauts, but seldom below or inland above. The wood is of good strength, and might be creosoted with effect.
154	Alstonia scholaris ..... Satween.	Grows to be a very large tree in the South Konkun. I have not seen it north of

		Nagotna. It affords excellent boards of thin planks for common purposes, as for pats for children at schools; hence the name. The bark is valuable in medicine. This tree is not found inland, but appears to grow freely enough in the Botanical Gardens.
155	Enonymus garcinifolia (?).	A small tree, growing near to the Ghauts in the upper country to the south. It seems to be often cultivated in Canara, on account of its straightness, as applicable for house rafters. It does not reach a size sufficient to fit it for general purposes.
156	Dalbergia Oojenensis .... Tewus. Tunnus.	Found both in the Konkun and inland forests; especially common in some parts of Kolwan, Khandeish, and the Satpoora Hills. It is a wood of great strength and toughness, especially applicable for cart-building, ploughs, &c. Seldom reaches a size sufficient to give a plank of 9 inches.
157	Celastrus montana ..... Mal. Kangunee.	A scrubby, crooked shrub, found in barren hills, chiefly of the Deccan. The wood is sought after as a choice dunnage for roof tiles, said to last for forty years—a duration greatly exceeding that of any other dunnage material.
158	Sterculia balanghas.....	A tall and straight tree, common in forests of the coast. It may readily be distinguished at certain seasons by its large pink fruit. The wood is of open grain, so that it probably could, by being creosoted, be made useful in various ways.
159	Sterculia fœtida ..... Bastard Poon.	Not common in forests, but more frequent about cultivated holdings on the coast. It grows up tall and very straight. Is used as a substitute for the true Poon spar in small country vessels.
160	Flacourtia montana..... Ran tambut. Uttuck.	A tree common in forests above and below the Ghauts, but does not, in as far as I have seen, extend inland. The wood is rather strong and close-grained, but the

		girth is never such as to render it sufficient for general purposes of carpentry or house-building.
161	Spondias acuminata	Sufficiently common in all the forests, both coast and inland. The wood in its natural state is not of any value, but could be creosoted with advantage.
162	Phyllanthus emblica . . . . Aonlee.	Tree is pretty common, both inland and on the coast. Wood is rather durable, but seldom obtainable sufficiently straight, except in gardens, where it is often grown.
163	Ixora parviflora . . . . . Koora.	Tree is common in the coast jungles, but seldom sufficiently long or straight for household purposes. The wood is rather of good quality. It is more used for torches than for any other purpose.
164	Ziziphus xylocarpa . . . . . Got bor.	The tree is very common in the coast jungles, but I have not seen it inland. It is, in as far as I have seen, useful only for torches, for which it is valuable; the fruit burned forms the base of a good blacking material.

No. II.

CONTAINING

A DESCRIPTION OF THE SYSTEM ADOPTED

FOR THE

CONSERVANCY OF TEAK FORESTS

IN THE

BOMBAY PRESIDENCY;

AS ALSO

A SKETCH OF THE FOREST COUNTRY.

BY

SURGEON ALEXANDER GIBSON, F.L.S.,

CONSERVATOR OF FORESTS.

PREFACE.

THE accompanying short Treatise has been rendered necessary by the circumstance of the organisation of the Forest Department having taken place only within the last ten years.

2. On this account Rules have from time to time been framed, according as circumstances arose, which indicated their necessity; and as no previous arrangements had been in force regarding Forests, the publication of such as have been found beneficial in their operation seem to be called for, not only as a guide for the officers who may succeed the present Conservator, but for the information of Collectors, Engineers, and other public officers.

3. The present Rules can by no means be considered as complete or final, for it may most likely be found advisable occasionally to add others, applicable to new cases, which may be expected to arise.

4. In reference to the account of Forest Pieces given in the first part of the Treatise, the undersigned may be permitted here to observe that the sketches, such as they are, have been nearly in every case given after a personal inspection of the tracts described.

ALEXANDER GIBSON,
Conservator of Forests.

Hewra, 6th May 1856.

CONSERVANCY OF FORESTS IN THE BOMBAY PRESIDENCY.

Situation of the Teak Forests in the Bombay Presidency.

THE Forests from which the supply of the Bombay Presidency is drawn are chiefly comprised in the belt of mountainous country which extends in a western direction, from the plains of the Deccan and Khandeish to where it meets or falls into the more open, level, and cultivated country bounded by the sea. Some of them are above the Western Ghauts, but the greater portion is below that range.

Branches of Forest Country in the Satpoora range of Hills.

2. Besides this, the Satpoora range of mountains and the spurs thereof afford a considerable portion of forest applicable to the supply of the people, but owing to situation and distance from the coast, not capable of bearing the expense of export towards the sea.

Forest of Barria and those to the north of Kupperwunje not included in the enumeration.

3. I do not include in the above range the Barria and other forests along the Nerbudda, because these, being mostly situated in foreign territory, do not come under our forest system. Neither do I take any account of the scattered forest which lines the hills of the Kupperwunje Country, and stretches thence in a north-easterly direction until the level country of the Runn is met with, because these jungles afford no wood which is exported, or worth exporting, beyond the province of Gujarat: all is required for the internal consumption of that country.

Forests on and near the Taptee River.

4. I begin then with those lying near or on the Taptee river. Of these the first is the Sagbaree, formerly a large forest under the superiority of the Gaekwar government. It is believed to have been much thinned or cut away; and as no conservative measures are taken to keep up a supply, it may fairly be presumed that it is in process of gradual exhaustion.

Forest on the north side of the Taptee in Khandeish limits.

5. Up from this eastward towards Khandeish, keeping still to the north side of the Taptee, Teak forest is more scattered, but the hills are said to afford a good deal of that wood, as well as Seesoo and Tunnus or Tewus.

Forest Piece of Mandvee, on the Taptee in the Surat Collectorate.

6. Further down the Taptee, but still on the north bank, is the younger forest of Mandvee, which since the lapse of that State has had some attention paid to it, and has been several times visited by the Agents of the Conservator; but the climate here is so deadly that no regular Foresters are kept up, as in most of the other provinces.

Forest on the Nessoo River, south of the Taptee, in the Nawapoora Mahal.

7. South of the Taptee we reach forest partly belonging to the British Government and partly to that of the Gaekwar. The former is chiefly comprised in the Nowapoora Mahal of Khandeish, the villages or the nominal villages of Tuppa Wanjpore, on the Nessoo river, which running north falls into the Taptee.

Forty-six Villages of the above furtively appropriated by the Gaekwar Government; discovery of the fraud.

8. Of these villages, forty-six have been, along with their forest, appropriated (we might say stolen) by the Gaekwar's Agent, the Killedar of Wanjpore—a fortlet on the north bank of the Taptee. This appropriation seems to have taken place about twenty-eight years ago, and the fact was first brought to light by Mr. George Inverarity about 1846, who discovered it on an examination of the Deshmooks and Despandias' registers or Dehdjarras of Baglan. The under-

signed afterwards followed up the subject, and found, in the Peshwas' Dufter in Poona, documents in confirmation of the facts elicited in the inquiry of Mr. Inverarity. Government subsequently took up the case, and having obtained from the Poona Duftur further information of value, embodied the whole in a very able review of proofs, contrasting the very scanty evidence produced by the Baroda Durbar—evidence which, by the way, rather confirmed than refuted the evidence produced by the British Government,—and ended by laying before the Supreme Government the whole of the circumstances, with a view to the resumption of the tract of country appropriated.

Northern part of the Dang Forests, and limits of that rented from the Rajas by the British Government.

9. The forest country south of Nowapoora to the fort of Roopghur belongs to the Gaekwar, and does not appear to contain forest of any value. It forms part of what is called the "Dang," but the greater portion of this Dang proper is rented by the British Government for the sake of its forests at a rent of Rs. 11,010 per annum. The parties from whom it is rented are Rajas and Surnaiks; of the former are the Raja of Garvee, the Raja of Wasoorna Derbowtee, the Naik of Pepree, and numerous sub-sharers.

Terms of the Lease; difficulty of imposing some of these.

10. In virtue of the lease, Government enjoy the right to the whole of the wood in these territories; also no cultivation involving destruction of forest can be undertaken without the permission of the British Agents—a provision, however, which is very imperfectly enforced, so that although the destruction annually committed is now much less than it used to be, it is still in some situations considerable. Not a little also takes place from the practice which obtains of growing beans and other edible creepers on the trees, and cutting down these rather

than be at the trouble to gather the fruit from the tree.

Description of Wood chiefly found in the Dang.

11. The open parts of this tract contain but little Teak timber of any size; but in the deep valleys and gorges of the hills, which are numerous, it grows with great length and straightness, not branching out till it has reached a good height.

Other Jungle Woods.

12. Besides Teak, there is also a large supply of building woods, as Kheir, Koosumba, Teemroo, Hedoo, Acen, Kulum, &c.

Duties to which the Timber is liable in passing through the Bansda and Gaekwar Districts, after leaving the Forest.

13. The wood felled here is subject to a duty of about 25 per cent. in passing out of the forest, either by the route through the territory of the Bansda Raja or by that of the Gaekwar. This tax operates so heavily as a discouragement to export that the jungle-wood is not of sufficient value to bear the transit, and hence it goes to waste in the forest.

Difficulty of exporting the Timber grown in the Eastern part of the Dang to the Coast, and hence reason for forming a Depôt at Chowsalah, in the Northern part of the Nassick District.

14. The timber which is grown in the eastern or back part of the Dang cannot be exported coastwards on account of the impracticable country lying between it and the sea coast; hence it finds a vent by the way of Baglan to Chowsalah, where there is a Government depôt. This depôt was formed at Chowsalah because there the country becomes level, and the cart-road to the Deccan begins, free from any natural obstruction. From the produce of the sales of wood here, one-half is credited to the Northern Department at Bulsar, and half to the Conservator's general accounts.

Details of the Establishment, &c. of the Dang Forests will appear hereafter.

15. I will not here interrupt the thread of the forest narrative by detailing the particulars regarding the constitution, expenses, &c. of the Northern Branch of the Forest Agency, as that will appear more appropriately under a subsequent head.

Scattered Jungles South of the Dang, in the Bugwarra Purguna, and near Damungunga.

16. Travelling south, I continue the sketch of the jungles which furnish our forest supplies. Outside the Dang, in the several districts, there is very little Teak forest: only a sprinkling on the banks of the Parnera river, up at Chinchye; a quantity of scrubby trees in the fort of Parnera, and a scanty appearance of young wood on the hills which divide the south-western portion of the Bugwarra Purguna from the Damaun territory. However, travelling along the Bugwarra river and the Damungunga, we enter the country of the Ramnuggur or Dhurumpoor Raja, in which is, or rather was, a considerable quantity of Teak forest.

Dhurumpoor or Ramnuggur Forests.

17. This country is mostly difficult for carts, and the roads are carried round by the bases of the hills, as a straight course, owing to the rises and deep falls, is not practicable.

Ramnuggur Forests may afford a supply of Crooks.

18. The straight Teak brought from this territory is mostly of small scantling, and seldom free from hollows and defects. From what I have seen, I would say that a good many crooks are still obtainable on the hills, as this is a description of timber seldom brought out of the forest, except when commissioned for a particular purpose, such as the building of ships or pattimars.

Waste caused by cutting of small Rafters here.

19. I conclude that great waste has been caused in this forest by the practice of cutting "Duskeas," —*i. e.* very small rafters, used for native houses and the covering-in of boats. Under good management this forest might produce a large quantity of serviceable wood; but years would be required to repair the reckless, exhaustive process to which it has been so long subjected. The Raja is overwhelmed with debts, and steeped in dissipation, so that I conclude little difficulty would be found in obtaining a lease of the forest on fair terms for Government.

Forest of Peth Hursool.

20. Leaving the Dhurumpoor country and going east, we enter the Peth Hursool territory, divided from that of Dhurumpoor by branches of the Damungunga. In this country all the villages in the western part have forest, chiefly of Teak, Tewus, and Seesoo. A strip of plain country, which intervenes in a line about 6 miles in breadth, and stretches under the Ghauts, has no forest, neither is there any on the Ghauts here which are more than usually bare.

Injury done by excessive Lopping.

21. In the western portion of the country, which is full of deep ravines, and contains many hills, the older Teak has been much injured by years of successive lopping for burning on the fields. The younger wood is of greater promise, but much care is required to keep this also from being lopped and mutilated by the reckless practices of the Ryots.

Tewus or Tunnus Wood common here.

22. Tewus wood is more common here than in most of the forest Talookas. It is a superior wood, having more strength than Teak.

23. The mode in which the jungle of Peth is managed will be hereafter described, under the head of "Establishments."

Forest in Sunjan Talooka.

24. Proceeding south from Peth we enter Sunjan, the northern Talooka of the Tanna Zillah. Throughout this Talooka every village of those more inland has its portion of Teak forest. The trees have, from the nature of the climate, soil, and situation, a natural tendency to shoot up straight and long, so that pruning or trimming is here little required.

25. In the black soil of several villages on the Sowta Creek and its branches, there is a large quantity of thick young forest sprung up within the last ten years, owing merely to having been let alone, instead of being annually cut off, as formerly.

Forest on Northern Border of Sunjan.

26. On the northern border of the Talooka, towards the Damaun boundary, there are also eight or ten villages containing young forest, but much of it, as well as that on the Sowta Creek, is so thick that, to give a healthy growth, extensive thinning is required. This has been begun within the last two years, and is now being proceeded with for the third year.

27. It would appear from the remarks made by Dr. Hove, a traveller who visited Gujarat in 1786, that the country immediately inland of Damaun at that time was covered with Teak trees of great size. It is from the roots of this former growth that we now have what forest is found here, with the exception of the younger plants naturally grown from the fallen seed of the older trees.

Kolwan, Mokhara, and Warreh.

28. Conterminous with Sunjan, and enclosing the Native State of Jowar, is this Talooka, with its subdivisions of Mokhara and Warreh Petas. Teak is to be found in nearly all the villages. Seesoo and Tewus are more confined to those which have hills near them, as these woods prefer the ravines under the slopes of the mountains.

Comparative quantity of old and new wood in Mokhara.

29. One cannot accurately state the quantity of old as compared to that of young wood found in this Talooka, but it may be estimated at one-fifth. Of this older material, the greater part is good for little, as the trees were so lopped and hacked during the years in which there was no conservancy. In some parts, as in those villages where the ravines abut on the Pinjal and Vyturna rivers, the younger trees are long and straight, but on the whole we need look for little large Teak that is straight in Kolwan.

Utility of removing older Trees.

30. The old trees, when felled, sell for about a rupee each on the ground; and from the stump, if the cutting be carried on at the proper season,

a promising shoot springs, so that it is rather an object to get rid of the doddered trees, always excepting those fit for crooks—a description of timber which is found in greater abundance in Kolwan than elsewhere, the trees being naturally so crooked as to render any assistance to nature fashioning them unnecessary.

Scarcity of Crooks; its cause.

31. However, even this crooked timber is scarce and difficult to find, the trees having been, owing to the cause abovementioned, viz. the reckless expenditure of forest for the twenty years preceding 1840, cut away, burned, or otherwise destroyed. Very many years must pass ere a large stock of crooked wood can be again available.

Bassein.

32. Bordering on Kolwan is the Bassein Talooka. In the eastern or inland part of this Talooka there is some small forest attached to most of the villages, but it is of no account except for rafter wood.

Jungle Timber exhausted here.

33. The jungle timber fit for building is very small in quantity; in fact it may be said to be exhausted, as may readily be supposed, from the proximity of the coast. On the northern side of the Talooka there is no forest attached to the villages, which mostly abut on the sandy shores of the Duntoora Creek and the sea. The best piece of forest in the Talooka is that under the spurs of Kamundroog, both on the east and west sides. Here there is much young wood, and the locality is favourable for its growth.

Mahim.

34. About six miles inland the forest country begins, occupying the range of steep hills which runs north and south from the Satpatee Creek to that of Duntoora.

35. There is not a great quantity of teak here. It is more scattered and less continuous than is the case in the neighbouring Warreh

Peta of Kolwan. On the shoulders of the fort of Took Mookh and some other scattered hills east of this range there is a good sprinkling of young forest; and towards the tops of the hills, by reason of the proximity to the sea, and the consequent pressure of the sea gales, there are numbers of old trees which have for some years past afforded a supply of second and third class crooks.

Jungle Timber exhausted here.

36. The jungle timber in this Talooka has, as may be supposed, been much depredated. In fact even of timber fit for export as firewood there is very little remaining, only Cheer and such worthless soft trees being left.

Bhewndy.

37. Bhewndy, abutting on Bassein at its northern end, and on Kolwan at its eastern border, shows no forest in the plainer parts, excepting the numerous young shoots, which have sprung up in quantity owing to the prohibition as to annually cutting them away; but as in the Northern Konkun this prohibition has not been practically enforced till within the last five or six years, all these trees are as yet very small.

38. In the villages and on the spurs of the more hilly parts of the Talooka, towards the fort of Maholee, at the western end of the hill, the Teak and Seesoo are more promising, and of larger size, also in the declivities of the range of which Ramundroog forms the crowning pinnacle, such as in the bounds of Doogaud, &c.

Tullojeh.

39. Tullojeh contains no present forest worth noticing, and will not make any show for many years to come.

Moorbar.

40. Moorbar contains a considerable quantity of young forest, but very few old trees, only such as were worthless having been left.

41. In the Kunowlee Peta the Teak jungle is thicker than elsewhere, except at Potgaum, on the road to Kallian, where there is, for about two

miles, a piece of forest tolerably thick, and the trees in a more advanced state than in other places.

42. In this Talooka it is only within the last five or six years that we have been able to restrain the practice of annually cutting off or top-lopping the young trees.

Seesoo on the Ghaut faces.

43. Towards the Ghauts in this Talooka there is much Seesoo wood, but chiefly young, the old trees being met with only in difficult situations.

Kallian.

44. Most of the villages a little way from the coast have their Teak and Seesoo preserves, and the number of trees in the Talooka may by and bye make a show. At present they are immature.

Tanna.

45. Judging from the information contained in the work of Dr. Hove, this island must have in 1786 contained much Teak of great size. The doctor speaks of the large Teak trees on the road from Bombay to Tanna and elsewhere. At present any trees of large size are not to be met with. In the different villages, chiefly owned by Parsee proprietors, there is a considerable quantity of small wood, and in the neighbourhood of Tanna itself is the "Sag Baree," which affords about the poorest specimen of Teak forest to be found in the country. It was planted by a former Collector, Mr. Dunlop; but the ground chosen is rocky and wretched in the extreme.

Cassimera Forest.

46. The only other continuous piece of preserved Government forest in the island is that of Cassimera, three miles south of Gorebunder. Here the jungle occupies the valleys and ravines between two or three sets of hills. Many of the trees are of excellent promise, and we have more than once got a supply of Sotas or large poles from hence for the Dockyard.

Deadly Climate.

47. The climate is, like that of some other detached localities near Bombay, deadly in the

extreme; a very bad form of jungle fever almost certainly attacks those who frequent this forest in October or November.

Panwell.

48. Here we have forest but in a few villages, most of those near the seaboard presenting a true vegetation of only a few Mangoes and Tar Palms. However, in the valley formed by the range of hills of which the hill-fort of Kurnalla or Funnel Hill is one, and a steep range which cuts this same valley off from the sea plain to the east, there is a very considerable quantity of promising young forest, and the same may be said of the next valley to the east, viz. that of Goolsoonda, where the sheltered slopes of the hills as they shelve down to the Apta Creek contain many patches of Teak.

Forest around Kurnalla.

Nusrapoor Talooka.

49. Bounded by those of Kallian and Moorbar to the north, and by that of Tullojeh to the east, it will be seen that, like Kolwan, the Nusrapoor Talooka is altogether situated inland. The broad plain, however, which extends from the Purbul and Matheran range of hills is nearly destitute of tree vegetation; but after crossing the Dynwellie river and encountering the spurs of the hills, which are here prolonged from the Ghauts to a great distance, the tree vegetation, particularly of Teak, is rather thick, and the trees are of a superior quality as to length and straightness.

50. Here also there is a considerable quantity of Seesoo near to and on the slopes of the Ghauts. The Teak on the east side of the Dynwellie river is in better preservation than most of that in the Kallian and Bhewndy Talookas, the orders of Government touching its preservation having been apparently obeyed at an earlier period and in a better manner than in these Talookas.

51. As the railway traverses the plain west

of the Dynwellie river, above mentioned, it is of much importance to have a supply of good wood in this quarter; and on this account care will be taken to preserve all the trees which are growing in situations favourable to their development.

Teak in the Kalapoor Mahal.

52. In the Kalapoor Mahal or sub-division of this Talooka there is a very large supply of young wood, covering the lower land of the ranges of hills which, jutting out from the Ghauts, divide the plain in which Campoolee is situated from the Dynwellie plain to the north of it; also on the several ranges of hills met with between Chowk and Campoolee. Further on, those which run from the Matheran Hill towards Panwell are equally wooded; and a large supply is found on the extreme southern boundary of the Talooka where it is divided from that of Penn by the Manekghur range of hills.

53. In all these slopes and hills every village has its piece of plantation; many of them, as at Kollotta, Nigrowlee, Asra, &c. very extensive, and all of them, owing to situation, valuable.

Penn Talooka and Nagotna Mahal.

54. In all parts of this Talooka, except the seaboard and Kharapat, each village has its forest piece, the trees being chiefly Teak. The best are those on the slopes forming the deep valley between the Ruttunghur range and that south of Manekghur; also on the eastern slopes of the cross range which divides the inland part of Penn from the seaboard and Kharapat. Here there is a quantity of fine wood, as the villages, comprising Neephar, Pada, Gagoda, &c. belonged to Angria, whose Government took care of the wood.

55. In the Nagotna Mahal, all the villages on the south side of the Meria Dongur have an ample supply of forest, and indeed throughout the Mahal the configuration of the country abounding in deep ravines, with steep scarps

overtopping them, gives shelter to great numbers of promising trees, chiefly Teak. The best are those in the upper course of the Ustmee river, on the slopes of the Soorghur and Aeen Mahal range of hills; also north-east of this, where a long valley runs up towards Jamboolpara, Nehra, and Tooksaee, following the course of the river, which rises below the Jamboolpara Ghaut.

Rajpooree Talooka, and the Mahals of Nizampoor and Tullch.

56. There is in this Talooka but little forest, excepting young Teak. A few Races or green-wood jungles are still left on the range of hills skirting the Rohee or Rewadunda Creek on the south side. Nearly all the villages in the Talooka and its Mahal sub-divisions have now some young forest within their bounds.

57. As the ground throughout the Talooka is undulating, and in most places hilly, even to the sea border, and contains none of the Kharapat or salt plain, the forest extends to the villages immediately abutting on the deep creek of Rajpooree. The best of the wood is at Doongrowlee, on the southern border of the Talooka, adjacent to the Goalee Tuppa of Goregaum.

58. There are also a few good forest villages below the line of hill which stretches from the western shoulder of Raeghur to Serowlee, beyond the Koomba Ghaut. The wood in those villages which line both sides of the Rohee Creek is, with two exceptions, viz. that in Walwa and Shenwee, young, and not fit for cutting.

Colaba; Alibagh.

59. The wood (both Teak and jungle-wood) has been carefully preserved ever since this tract of country came under the rule of Angria, which even, I think, dates from the taking of Severndroog by Admiral Watson's squadron. The hilly chains which run across the principality in three directions are studded with trees. Of these most in the more exposed parts of the hills have but a

stunted growth, but form in time good crooks. In the dells and valleys the wood is larger, but never appears to reach a size which can afford a log of more than 2 khundies. The quality is excellent, and the crooks are very strong. I believe that the bridge-of-boats on which the British army crossed the Sutledge in 1847 was built from Colaba crooks.

60. There is a little jungle timber which would have an export value. The quantity of it is not above one-fifth in proportion to the Teak.

Raeghur Talooka, with its Mahals, Beerwaree, Kondvee, and Goregaum.

61. In this extensive Talooka about two-thirds of the villages have more or less of forest, and this may be said to be entirely of Teak, because, from the number and proximity of the different estuaries which intersect the country in several directions, the facility which attended the export of firewood to Bombay is so great that no jungle forest has been left. Hence, in nearly all the villages where there is any forest, the cultivators have long ago been destitute of any wood except the branches of Teak for burning on their fields; and those in which there is no forest make out as they best can, with the aid of bushes, grass, and cowdung, for affording the alkaline matter necessary for the cultivation of their fields. Hence in this Talooka the jungle fee system yields a smaller return than that realised from the Northern Talookas.

62. The forest covers those hills which abut on the Bankote Creek, here often inosculating with the neighbouring territory of the Hubshee, who formerly had joint rights over a great part of this and the adjacent Talookas. This intermixture makes conservation difficult and expensive.

63. The other portions of forest in the Talooka

are—1*st*, that on the line of hills on both sides of the Savitree river towards and beyond Mhar. On the western side of Mhar, with the exception of Dasgaum and Doongrowlee, where there is an extensive piece of growing forest, the hills are bare, and destitute of any wood whatever, save here and there a group of Mango trees. Beyond or to the east of Mhar, where the road branches to the Beerwaree Mahal to the left, and to that of Kondvee by the right, all the hills have their portion of growing forest, at first scattered and small, but as the mountains close in much more dense, though in the dry season the appearance is that of a mass of poles on each hill rather than of trees.

Forest in Beerwaree Mahal.

64. The Beerwaree Mahal being altogether hilly, with rice valleys between, gives on the slopes much land fit for the growth of trees, and is generally covered with them for two-thirds up the hills. The flat tops are devoted to dry cultivation.

Forest in Kondvee Peta.

65. Looking across the Savitree we see the rather deep valleys and intervening steeps of Kondvee Peta to the south. These are but sparingly furnished with forest, till we cross the Khind which brings us into the Tooreel valley and the villages stretching from Tamaneh high up to the east, to Tooreel, where the Savitree is again approached.

Forest of Tooreel and Yenereh Tuppas.

66. The forest of the whole of these villages has formed, since 1822 or 1823, a Government preserve, or rather reserve, no cultivation likely to be injurious to the trees being contained within these limits. This reserve was formed by the late Mr. Dunlop at the time he issued his proclamation of 1822, making over the right in Teak and Seesoo forest to the Ryots of the Konkun generally. The whole of the forest

appears to have been sold in contract about 1830, the contracting purchaser having been allowed to cut and take away as much as he could remove within the two years. Since 1830 the trees (shoots and offsets) from the stumps of the former forest have not reached any size; partly because it is probable that from 1830 to 1840 many private persons obtained licenses to cut for their own purposes, and these generally took advantage of this permission to remove the best of the trees. Since 1845 they have been under regular conservation, and have since then materially improved. The best are at Tamaneh, Yenereh, and Reotulla; those at Adista, Moomoorsee, Dabut, &c. are of more recent origin, but numerous in quantity, and hopeful as to quality. Still, as I told Government in my report for 1845-46, paragraph 19, for all our large timber we must ever continue to look to the southern forests, and for that of medium size to the northern forests.

Peculiar Tenure which existed in the Forests of the three Southern Talookas.

67. The before-mentioned three Talookas of the Tanna Collectorate, viz. Rajpooree, Raeghur, and Penn, had their forest tenure on the same footing as that which prevailed in the Rutnagherry Collectorate, whereof they had formed a part previous to 1826, viz. all the trees, Teak and other kinds, had been made over to the Khotes, Patels, and others, with the view (as stated in the proclamation) that these parties, having a direct interest in the forest property, would, under this stimulus, continue to keep up a supply of wood for their own purposes, and likewise for sale to Government or elsewhere. This hope was found to be totally delusive, and as forest was rapidly disappearing everywhere in the Southern Konkun, Government in 1840 summarily put a stop to the cutting of Teak for private purposes.

Finally, in 1851, the proclamation of Mr. Dunlop having been formally revoked, the State reassumed its seignorial rights in Teak and Seesoo forest.

Revocation of the Proclamation of Mr. Dunlop of 1822.

68. In this tract of country, now forming the Collectorate of Rutnagherry, there is so little of forest to be described that a separate notice for each Talooka is not required, as in the case of the Northern Konkun. The proclamation of 1822 having had full publicity and scope for its operation here, seems to have remained in force even after the Government prohibition of 1840, above mentioned, so that excepting in the two small Government preserves—one on the Anjerla Creek and a second near Malwan,—the small trees were annually cut off for burning material.

Forest in the Southern Konkun south of the Savitree River, Rutnagherry Collectorate.

Injurious effects of the Proclamation of 1822 in the Rutnagherry Collectorate.

69. In a very few places, such as Berownda and Seedghur, in the Malwan Talooka, small pieces of forest had been spared, but with this exception the destruction was general. From this it will appear that the proclamation of 1851, abrogating that of 1822, was imperiously called for.

70. The preserve on the Anjerla Creek now extends over ten villages. It was originally formed by Angria, for the use of his fleet, when he held the fortress of Severndroog, and it would from records appear that at this time the Teak generally throughout the Talooka, but especially that in the rugged country under and near the fortress of Palghur, was carefully preserved. All of the latter passed into private hands in 1822; consequently none of any age or size now exists, but of young wood under the present system of conservancy the supply is large.

Government Preserve on Anjerla Creek.

71. The wood of the Anjerla preserve seems to have been sold about 1829 in the lump, so that the present forest consists chiefly of trees which have since that date sprung up or shot forth from

the older stumps. Besides these, however, are many seedlings of natural growth. The trees are straight, and mostly sound in quality. Of the whole, the seedlings may in time reach a good size, but it appears doubtful whether the others will ever attain to anything beyond the size of Sotas for pattimars and such like craft.

Plantations on the Dabul Creek.

72. In a few villages of the Dabul Creek are small plantations, some of them in the grounds of small landholders, who have reared a few trees for their own use; but this providence is rather the exception than the rule, and where Teak is found in such ground, and in the enclosures around dwellings, it is carefully respected as private property.

Teak in the Rutnagherry and neighbouring Talookas.

73. In the Rutnagherry Talooka, and in the upper part of the Zyghur Creek, as also in the Mahals of Lanja and Kareeputtun, are a few small pieces of plantation, but in none are the trees of any size. I did not find either that in the country extending from Sungumeshwur to south of the Phonda Ghaut there are any extensive pieces of forest, but some of the villages have their patches of wood, seldom numbering above 3,000 trees, and these in the early stage of growth.

Hurkool, Berownda, &c. in Malwan Talooka.

74. South of the Phonda Ghaut are some villages where Teak has been in some degree preserved, probably owing to the example afforded by the neighbouring State, Sawunt Waree. These villages are Hurkool, Berownda, &c. before mentioned. Still even in these the trees have never been allowed to attain any size, and further inland, on the shoulders of the hill-fort of Seedghur, where the land being Government property, and "Ghuer Dustee," the trees have remained untouched, and there are some of respectable size.

Preserve at Maun and Kandulgaum.

75. Further south, and after descending through much rugged country, we come on the

small preserve at Maun and Kandulgaum. This forest piece may contain about 6,000 trees, the shoots from the stumps of larger ones, which were sold about 1829. Like those in Anjerla, they are straight, and free from side branches, but seem not likely to attain any large size. In the different forest reports will be found details of the cutting and trimming operations which have taken place in these two preserves, viz. Anjerla and Kandulgaum, between 1842 and the present time. With these exceptions, no forest operations have been carried on in this Collectorate by the Conservator's establishment.

Teak on the Borders of the Waree State.

76. Towards the Koodal Creek, on the Waree border, is a small plantation, near the Chokee, and also in several villages along the northern bank; crossing this we are in the Sawunt Waree territory.

Sawunt Waree Forest.

77. The forest in this State is confined to a range of hills beginning at Banda, and running up towards the capital, branches into two divisions, in the hollow of which is situated the town. From hence by Mangaum the same range runs east, and when near the Ghauts takes a northern sweep, parallel to these, and separated from them by a series of deep valleys. On the spurs and in the hollows of this rugged country there is a considerable sprinkling of Teak forest in some parts, as at Kesree, Kenloss, Heerlock, &c.

78. Here, as also near the capital, it is said the Teak was, if not planted, at least much attended to, and well cared for by the Desaees of the Waree State, with a view to its use for their piratical navy. However, since the country became unsettled and disturbed by armed bands, events which may be said to date from 1825, this branch of economy seems to have been neglected here, and Phond Sawunt and

other parties, who knew the value of the material they had in the vicinity of or on their estates and Jagheers, are said to have appropriated and sold it to a large extent. Hence from the Kesree forest, along the hill range to Kulsolee, the trees are mostly of recent growth, and this is still more the case in the vicinity of the capital, where there are only shoots from the older sticks. Some years ago the Kesree forest was examined, with a view to naval supply, by myself and Mr. Poulton, the Southern Agent. All the trees of large size were found to be decayed at heart, and rotten for about six feet up the stem, consequent, it is believed, on jungle burning around them at successive stages of their growth. Seesoo or Blackwood is rather common on the range running north from Kesree, but the trees are small and immature.

Forest from Kesree to Kulsolee.

79. There has been a good supply of junglewood in the State, but the great prevalence of Koomree or destructive cultivation has greatly reduced it. The Hebulsoo or Pat Phunnus (Wild Jackwood), valuable for canoes and other purposes, is not uncommon, and is one of the woods which was preserved by the State. The Poon (Calophyllum angustifolium) is also found, but is not common.

Destructive influence of Koomree Cultivation here.

Hebulsoo or Pat Phunnus.

Poon.

80. South from Kesree as far as the Goa border, and up to the Jambootee and Belgaum boundary, on the Ghauts, there is no Teak forest, but in places where the tree vegetation has been allowed to remain, the timber of other descriptions is long and straight. On the Ghauts it is nearly all cut away, and on this subject there was an extensive correspondence in 1844 and 1845, as may be seen by referring to the records.

81. This, though not under the Bombay Presidency, but belonging to that of Madras,

Soonda and Canara Forest.

may claim a notice here, both by reason of its affording a large amount of supply for the Bombay Presidency, and also because the Bombay Conservator has some share in advising as to the internal arrangements regarding it.

Power of Control in the Soonda Forest only nominal.

82. As yet, however, this power of control has been only nominal; so that, notwithstanding repeated remonstrances on his part, the work of destructive cultivation seems to have gone on unchecked, and has reached to such an extent as seriously to threaten the supply of Teak, Seesoo, Honee, and other valuable woods.

Parts of the Soonda Forest most favourable for Teak growth.

A reference to the forest report of the Conservator for 1854-55 will show those parts of the forest in which the largest quantities of Teak and Seesoo timber are found; but it may be stated generally that at Nuggur-Gallee, Mawlinga, Bircheenulla, and Gond, the soil and shelter are more favourable for the production of large and straight trees than in any other part.

Size of Soonda Forest over-estimated by the Madras Authorities.

83. The size of this forest has, I have reason to think, been very much over-estimated. From the line of road leading from Yellapore to Dharwar, to the northern bounds of Sambranee, and Tittihala, the length may not exceed 30 miles, which, taking the greatest breadth, viz. from Tittihala to Nursoor and Gond, at one end, and from Sambranee to Juggulpait at the northern end, the extreme breadth of the forest where it contains Teak and Seesoo is not more than 16 miles. The western part of the forest contains no Teak or Seesoo; only green-wood jungle of the Laurel and other tribes; so that on the whole I would say that there is not more than 244,000 acres of space containing building-wood and Bamboos, instead of 1,000,000 of acres, as I have seen estimated; and even of this space at least one-half is open glade.

Probable estimation by Conservator.

Western portion contains only Green-wood Jungle; no Teak.

84. Without touching on the forests, or remains of forests in Malabar, which are entirely under the management of the Government of Fort St. George, and from whence we draw our supplies of Teak, Jungle-wood, and Poon spars, by means of a purchasing agent (with the exception of that of Annamala, under Coimbatore), which is worked under the direct agency of Government officers, and furnishes plank to our depôt at Ponany; also without giving more than a passing allusion to the extensive and fine plantation made at Edooana, in Ernaud, by the late Mr. Conolly, Collector of Malabar, and which forest will be an important source of provision in future years, I turn north and east, to give a rapid sketch of our sources of supply in the countries above the Ghauts; and first of—

Edooana Forest, planted by the late Mr. Conolly.

The Dharwar Forest Preserves.

85. *The Dharwar Forest Preserves.*—Of these I need say little, as they are not likely to afford building timber for many years to come. They are situated in the Nusrakote and some other Talookas. I have not seen them since their formation, but from what I know of the ground, &c. I have no hesitation in saying that the Collector has done right in recommending that all cutting be stopped in them for some years to come.

86. The principal supply of wood for this Collectorate and the neighbouring one of Bellary must always come from the adjacent forests of Canara and Soonda.

Belgaum Collectorate Forests.

87. *The Belgaum Forests.*—Towards the Ghauts the forest is all jungle timber, but there was much of this of superior quality. Since 1850 great destruction has taken place by burning and otherwise.

88. The Teak and Seesoo forest does not begin to be found till within 6 miles east of the Ghauts. From thence it extends through the

Gotgalee and Kukehree Kreyats, and had at one time stretched as far as the present station of Dharwar.

89. In the deep valleys under the hill of Seedh, extending to the Madras frontier, there used to be many large trees. These have been much cut and burned away under extending cultivation, and it is only within the present year, by the exertions of the Revenue Commissioner Southern Division using his influence in aid of the repeated and hitherto fruitless representations made by the Conservator, that any effectual stop has been put to the annual burning and rooting out which had since 1850 been going on. Of young growing Teak there is a respectable quantity in the western end of the forest abutting on Seedh Hill, while further to the east the trees, though numerous, are of a stunted character, and will probably never afford any timber beyond that fit for rafters and small posts.

90. There is one wood of great account for building purposes, both in this and the neighbouring forests, viz. Hussun or Honee (Pterocarpus marsupium). It is a beautiful tree, of easy growth, and to replace the very extensive destruction of it which has taken place, by cutting or otherwise, the Conservator has recommended that one or more plantations of it be made.*

91. Of the Belgaum forest to the north there is only the Padshapore Peta, which contains stunted timber of Aeen, Satin-wood, Neermullie, and other wood, which from their size are of little account, except for firewood and tent pegs. However, in a country so generally bare, the item of firewood is not an unimportant one.

92. *Kolapore and Sattara Forest.*—Of this it may be stated generally that it is rather a tract

Forest Country from Belgaum to the Northern limits of Sattara.

* Of these one was made in June 1856.

which has at one period contained forest than one now actually showing any.

Assiduous destructive cultivation by clouds of Shetsundees, and others of that description holding office under the Native Governments of Kolapore and Sattara, have tended to sweep away the remains of anything in forest shape, except a few scattered jungle trees and bushes. This steady destruction seems to have taken place to quite as great an extent in the Sattara as in the Kolapore State, and if the higher jungles of Mahabuleshwur escaped this influence, such immunity is to be attributed to their comparative inaccessibility, and the thin population of the villages near them, than to any other cause.

Conservancy Measures in the Sattara State.

93. Since 1847 some attempts have been made to keep up or extend the forest in the Sattara State under a regular system of conservation, and about Rs. 30 per month are devoted to that object. It will be very many years before the forest extends so as to afford a source of supply to the people. At present, what with sales of leaves and occasional thinnings, the cost of establishment has been defrayed for the last three years, but I do not expect that this balance to profit can be permanent.

Forest in the Poorundhur and Singhur Valleys.

94. Proceeding north from the territory of this State we reach a line of country comprising the deep valleys and hill spurs which run off from the great mountain system of which Singhur and Poorundhur form the centres.

Importance of these Preserves for the bare Country to the East.

This piece of country contains a great deal of forest, chiefly Teak, but none of it likely ever to reach a great size. However, as a source of supply to the bare treeless country to the east, as well as to the adjacent large city of Poona, it is of much value. The greater part of it, forming part of the Ghera of the two hill-forts above

mentioned, was carefully preserved in the time of the Peshwa's government, and since 1840 has been attended to by the British authorities.

Thinnings at the Singhur and Poorundhur Forests.

For the last twelve years a series of thinning operations have been carried on at Singhur, and for about seven years past in the Poorundhur Ghera at Keekvee. The more promising of the trees are kept for future purposes, while the stunted and gnarled ones are cut away to allow of the stumps producing straight shoots.

Teak Preserves near Poona.

95. From this Ghera, when it opens on the Moota Moola Valley, towards Poona, most of the villages from Bahoolee eastward show promising patches of Teak plantation.

The Share System introduced here; its details.

These are mostly kept up on the share principle, the Patel or some other chief authority undertaking the supervision of the trees, and trimming them as required. In consideration of this he receives a share—one-fourth to one-third, according to circumstances, of the proceeds, when a cutting takes place,—and has the benefit of the pruned material for his own use. He also shares in the annual sale of the leaves, which have here, on account of the proximity of the city of Poona, a considerable market value.

Forest between Poona and the Bheema River to the West.

96. From this part of the country as far as the Bheema river, keeping to that line where the spurs or offsets from the Ghauts run from west to east, and enclose valleys generally pretty wide and fruitful, the hills are now beginning to be more or less covered with young Teak of spontaneous growth. Under a continuance of care, these patches of wood will in time thicken up into respectable bits of forest. Formerly the young shoots perished under annual cutting for burning on the fields. The valley of the Bheema high up—*i. e.* within the line of country above mentioned—has now a range of about fifteen villages

on both sides of the river, where the Teak vegetation is pretty general, each village showing from 2,000 to 3,000 trees.

Forest of the Gor Valley.

97. Further on, in the next valley, that of the Gor river, in the same line, there are upwards of twenty villages which are thus wooded, the trees keeping to the steep sides of the hills, and as usual disappearing as we approch the top of the ranges, which form here extensive grassy flats and bare plateaux, reaching quite to the top of the Ghauts; but the Teak vegetation disappears as we proceed west, and is succeeded by stunted jungle or bushes with a few trees.

Forest in the Kookree Valley.

98. The next valley, that of the Kookree and Meena, is but poorly furnished with forest. Young Teak trees, however, are now springing up in some quantity at Chincholee, Parownda, Neemduree, Budgee, and a few other villages.

Forest in the Mool and Pruvara Valleys.

99. The Mool and Pruvara Valleys are thickly studded with young wood, a good deal of it of some promise, but the greater part stunted and crooked. Still it will be—indeed already is—of great importance for domestic purposes.

Preserves of Water Jambool.

100. Here also, as well as in the valley of the Gor, are numerous plantations of the Water Jambool. These grow in the shifting beds of the rivers, and have been from of old conserved, as the wood is of excellent quality, and used largely for house rafters. Indeed for this purpose they appear to be as durable as Teak.

The number of Teak villages on the Mool river may be forty, more or less, reckoning from Peemgeree westward.

101. On the Pruvara river they are fewer and more scattered, and have suffered in their tree vegetation, owing to our Conservative Rules not having until lately been applied to them. The Teak is of much the same character as that on the Mool river.

Forest on the Slopes of the Darna River.

102. From hence, the country being more open, and not traversed by any river system, there is no forest until we reach the slopes of the Darna river, which rises in the vicinity of the forts Oonda and Puttà. Here there is a trifling quantity of Teak vegetation in a few villages, but as yet mostly small and immature.

Forest in the Dindoree Talooka.

103. From these hills, across the wider plain of the Godavery, the country is nearly destitute of tree vegetation, and so continues until we reach the Dindoree Talooka. In this quarter there is now a respectable sprinkling of young forest in many of the villages, and it continues on so till we reach the foot of the hills forming the western part of the Chandore range.

Tewus or Tunnus frequent here.

Here also the Tewus (Dalbergia Oojenensis) is found in more than ordinary frequency, and altogether this Talooka promises to show after the lapse of some years a good quantity of forest, none of which, however, will reach any great size.

104. Of the Chandore range, the western portion was, even when I first visited the Deccan and Khandeish, well wooded; but these hills are now nearly bare, owing to the cultivation burnings which annually take place.

Forest in Baglan Talooka of Khandeish.

105. The Mawul Country of the Khandeish Collectorate, viz. Baglan, exhibits on the hills towards the western part a good quantity of Teak, Tewus, and Seesoo, the growth of the last ten years, and this, if encouraged or even if let alone, will after some years be of great consequence to that Collectorate. The forest here is attended to by the keepers (one Naik and three Peons), who are entertained during eight months of the year for the purpose of watching the eastern outlets of the Dang Forest.

Forest North of the

106. Beyond the limits of the Baglan Talooka

Taptee, and on the Satpoora Range.

circumstances have not admitted of our hitherto establishing any regular system of conservation.

107. I have thus given a rapid sketch of the lines of Teak and Seesoo forest under the immediate or indirect control of the Conservator.

I have forborne to say anything regarding the pieces of forest on the Satpoora Hills, and in other pieces north of the limits of the Baglan Talooka, because want of time and other circumstances have concurred to prevent the Conservator bringing those under our regular system; but as the work becomes more settled and regular in the older districts, this can in the course of years be effected.

Babool Preserves in the Eastern Districts of Poona and Ahmednuggur.

108. To complete the account, I now add a few notices of the Babool and other preserves under the Conservator's control. These Babool preserves had been for years mostly placed at the disposal of the establishment of the Allegaum Stud. On the abolition of this establishment, they, in 1846, passed into the hands of the Collectors of Ahmednuggur and Poona. At that time it became a question whether they should be made over to neighbouring cultivators and others in farm, or whether they should be conserved on account of Government. A considerable amount of correspondence passed on the subject, part whereof may be seen in the printed records of the Bombay Horticultural Society for 1852. Finnally, under the strong representations made by the Conservator, and by A. D. Robertson, Esq., then Second Assistant Collector of Poona, in charge of the Bheemthuree Talooka, backed by the opinion of the Collector, it was determined that they should be kept up by means of a regular establishment, and kept in condition by means of annual thinning out of inferior and crooked wood. Accordingly, from that period

until now an annual thinning has taken place, and we have not got through the whole.

109. The preserves are situated in the alluvial soil on both sides of the Moota Moola and Bheema rivers; in fact just in the same sort of ground as the Shikargahs on the Indus. The preserves under the control of the Conservator are, according to their village divisions, named as follows:—

Toolapore.	Khangaum B.
Aptee.	Ditto Tek.
Kolowree.	Tulleegam D.
Hingungaum.	Koregaum Mool.
Bolac (the Waree).	Lonee.
Khamgong.	Nandoor.
Doongurgaum.	Peepulgaum.
Koregaum B.	Peirna.
Manjuree.	Phoolgaum.

On the Ahmednuggur side—

Arungaum.	Nagurgaum.
Allegaum.	Oorulgaum.
Sadulgaum.	Mandogna.

They now contain many thousands of Babool and Bher trees, likely in future years to afford an extended supply of material.

Mode of making these Preserves yield an Annual Return.

110. One or two of the preserves is thinned out each year between the months of November and March in the cold season, and in February and March the pods and tender branches of the Babool are sold to shepherds, who each contract for the produce of one or more of these preserves for the feeding of sheep. The net profit from these preserves during the past season was upwards of Rs. 1,000, after paying all charges of conservation.

Net Profit in 1854-55 upwards of Rs. 1,000.

111. We have not yet begun a series of annual operations with the preserves on the Nuggur side, as these have more lately come under the Conservator's system.

Babool Preserves in Poorundhur Talooka, and in certain parts of the Belgaum Collectorate.

112. There remain also some new Babool preserves in the Poorundhur and Uthnee Talookas which, having been only lately set aside, are not yet in a state of permanent organisation, but are in process of being so.

113. Having thus given a *resumé* of the various pieces of forest with which the Conservator has to deal, I now proceed to describe the details of management, modes of issue, and other particulars connected with the objects, system, and rules of the Forest Department.

Detail as to the Mode of Managing the Forest generally.

114. As to the objects of the Conservator's establishment, these are—

1*st*.—To provide a sufficient supply of timber for the wants of the Government and the requirements of the people without trenching on the capital of the forests; or in other words to keep continually supplying sound timber, and preparing a stock of standing wood for future wants.

It will, from the contents of several of my forest reports, be seen that I have long ago pointed out the fact that in the forests properly within the Bombay limits we have no supply of very large timber applicable to the public wants, except in the article of curves. That in future years a moderate quantity of this may be obtainable is probable enough; but in the meantime much of our Teak vegetation consists of shoots from older sticks, and this kind of wood will never compete as to size and straightness with seedling trees of natural growth. It will, however, be found that vast numbers even of the latter have sprung up, and are in progress to maturity, under the shelter of the older wood; but probably half a century will elapse ere this description of vegetation will reach the same extension as it is described by Dr. Hove (see his Travels) to have done in 1786. In the meantime then we must look to our own

forests only for curves, rafters, pillars, and such like pieces.

Effects of the reckless System of Cutting and Burning.

115. It is melancholy enough to think that we should be reduced to this point in regard to domestic supply, and much of the want is due to the reckless system of cutting and burning away which had taken place unchecked during the first twenty-three years in which the forest districts were in possession of the British, who, acting on the principle that where an article is in demand the interests of the people of the country will at all times lead them to raise a supply sufficient for that demand, allowed matters to take their natural course, and were at length roused to a sense of the inapplicability of standing maxims of political economy to all climates and countries by the increasing scarcity and dearness of Teak timber.

Mistaken Policy at first pursued in regard to our Forests.

Subject taken up by the Bombay Government in 1838.

116. Hence in 1838, 1839, and 1840 the successive governments of Sir Robert Grant, Mr. Farish, and Mr. Anderson took the subject in hand, and at once adopted measures for stopping the indiscriminate destruction which had for years been going on.

That these measures could all at once be effectual was not to be looked for; but they gradually have been more and more successful, so that under their operation we have, as will be seen from the preceding pages, a very large supply of available timber.

Timber for Naval and other Public Purposes must continue to be procured from the Dang, Soonda, and Malabar Forests.

117. For public purposes, especially of the Naval Department, we mainly depend on two sources, viz. the Northern Forests or "Dang," between Surat and Khandeish, and the supplies from Canara and Malabar, those from Canara being the produce of Government forests, and those from Malabar partly from that source and partly from private purchase made by means of the Government Agent.

Wisdom of the measures for renting the Dang.

As will be seen in the former chapter, I have already given a sketch of the amount of supply to be looked for from the Dang, and this will demonstrate the wisdom of the measures taken in 1841 for the renting of this forest.

Poon Spars, Source of Supply.

For Poon spars we depend entirely on the Canara Provinces, chiefly under the Coorg Ghauts, but no system has been yet organised for the regular supply of these otherwise than by contract.

Objects of the Forest Conservancy.

118. Another special object of the forest conservation system is to abate, in as far as is practicable, the destructive system of hill cultivation by the burning of trees, and clearing the ground which they occupied for the sowing of inferior grains.

Diminished Supplies of Timber, owing to excessive Destruction of Forest.

This system of steady and continued encroachment on our forest lands has begun to tell seriously on our supplies of timber and fuel, especially in Sind and the southern districts of the Belgaum Collectorate, and it is only now that measures of real efficacy are beginning to be enforced; but even with the aid of these it will be found most difficult to repair the waste which for nearly forty years has been going on, and still does go on, wherever the eye of the master can be eluded.

119. Another object of the conservative measures is to keep the tracts containing Government timber free from encroachment by neighbouring Inamdars, whose possessions, particularly in some of the more wooded parts of the Konkun, are very extensive.

Ruinous System pursued by Inamdars in regard to Forest.

120. These parties usually let the pieces of forest which their villages contain (supposing that they possess the royalty over Teak and Blackwood timber) out to farmers, who cut all trees, mature as well as immature, and too often in doing so encroach on those within the Government boundary.

About a quarter of the Conservator's correspondence is solely taken up in answering references on these subjects, and it has been found necessary to issue a stringent circular order forbidding such persons to cut down their Teak forest without previous permission and notice, in order that the Government officers may be prepared to guard the wood within the Government bounds.

Continual references and disputes, arising out of the system pursued by Inamdars; a palliation suggested.

121. Another rather important object of the conservation system is to endeavour to keep the Ryot provided with what is in many places greatly needed, viz. wood, branches, and leaves, for burning on his fields, and regulate the expenditure of this in such a manner that there shall be no risk of prospective deficiency of supply.

Provision for the wants of the Ryots under the Conservation System.

In many villages the Ryots have their own pieces of Rab ground attached to their cultivated holdings, and it is held that in these all the trees, with the exception of Teak and Seesoo, which are royalty are available for the use of their fields. Accordingly, from December to the end of February, these trees are lopped and deprived of their side branches (and too often of their tops also), the branches being applied to furnish the alkaline or calcareous matter required for the rice and other cultivation.

Rab Grounds of the Ryots preserved to them with the exception of Royalty Trees.

Where this description of manure material is kept up in sufficient abundance, the Conservator's Department are too happy to abstain from all interference with its disposal or application; but in many parts of the country it has happened that the Khotes and the Ryots have, through their own improvidence, in completely cutting away the trees, or destroying them by the more speedy process of hill cultivation above mentioned, in a great measure or wholly deprived themselves of this source of supply; and in such cases it becomes the duty of the Conservator cautiously to

Great want of Raw Material in many Districts, owing to improvidence of the Villagers.

Assistance afforded in aid of this want.

afford them assistance from the redundant growth of the Teakwood preserved by Government.

Raeghur Talooka destitute of a single Material for Burning.

Thus in many parts of the Raeghur Talooka of the Tanna Collectorate there remains no tree material whatever to be applied to the fields, with exception of the Teak, which fortunately now lines the sides of many of the hills in considerable quantity.

Danger of allowing indiscriminate access to the Young Forest.

Were permission granted for the Ryots indiscriminately to possess themselves of the side branches of these trees, they would not only do this in a destructive manner, but (as has been found by dear experience) the tops would be lopped off also, and all root-shoots carefully cut away as they appeared above ground in vacant spaces where Teak had formerly grown.

System of giving Forest Shares to Khotes.

Hence it became necessary on this account, as well as by reason of the involved question of property originated by the proclamation of Mr. Dunlop in 1822 (repealed in June 1851), to give the Khotes of the villages of the three Southern Talookas of the Tanna Collectorate a share of the produce (generally one-third), on condition of their taking care of the trees, having them carefully trimmed, and applying the trimmings to the use of their Ryots; a proviso also being inserted in the agreements that the Darekurees, who often cultivate tracts of hill land independent of the Khotes, are to be dealt with in such a manner as to leave them no room for complaining to Government that they have not received their share of the third of the produce paid to the Khote.

Inconveniences of the Share System.

This plan of agreements is attended with several inconveniences, especially those arising out of numerous mortgage claims; but it seemed to be the only one practicable under the circumstances of these Southern Talookas. In a few cases the heads of the village, not being Khotes, have been

dealt with on the agreement system, their share of the produce being generally fixed at one-fourth. Within the last four years, however, we have not deemed it expedient to extend the plan of share-giving to parties not in the position of Khotes, it being found that the persons undertaking the responsibility of keeping the forest in order are often unable to cope with the divided interests of the different Ryots of a Khalsa village, and also because they give quite as little attention as the Khotes do to keeping the trees in order. They usually have trimmed only a few—sufficient for their field manure,—and leave the remainder untrimmed.

Extension of the Share System to other Heads of Villages not deemed advisable; reason why.

To remedy this defect of the plan just mentioned, in both classes of villages we have latterly taken the precaution, when a cutting does take place in any of them under an agreement, that the Khote or other keeper shall have due warning to have his trees trimmed by the end of January, and that, should he neglect or refuse to do so, they will then be trimmed out of the proceeds of his share of the cuttings.

Trimming enjoined on Heads of Villages and others, on pain of Forfeiture of the portion of their Share which may have been applied to cover the Expenses.

The share system has also been extended to a number of the Deccan villages in which Teak grows, but the success of the measure, in leading the village heads assiduously to keep the trees in order by pruning, has been limited.

In some parts of the Northern Konkun, especially in the Kolwan Talooka, where the Teak and Seesoo forest has always been worked, chiefly for behoof of the State, agreements have been taken from heads of villages to allow them and their subordinate Ryots the use of the Teak branches for their fields, without giving them a share of the wood produce when cut down; but as these people are not to be trusted on account of their dissipated habits, it is found necessary to bind

Security taken from Villagers when allowed to trim the Trees for the use of their Fields.

them down by security that the trees shall not be head-lopped or otherwise mutilated, and that the root-shoots shall be left entire.

The System of Conservancy.

122. We now enter on the system pursued in carrying on the measures of conservation. The Conservator has under him four Assistants (Europeans) for carrying on the duties in provinces or places so extensive as to require a separate establishment for themselves.

Establishment entertained for the Dang Forests.

Thus for the charge of the rented forests of the Dang there are a First and Second Assistant to the Conservator, a separate office establishment, with Accountant, Measurer, &c., and an outlying force of Mehtas, Jemedars, and Peons for the forests of the Dang. All these are entertained and paid by the First Assistant, who sends his abstracts, contingent bills, and other papers through the Conservator, by whom they are handed up to the Chief Engineer.

The Officers in charge of the Dang enjoined to visit the Forest at stated periods.

The First and Second Assistants, being under the control of the Conservator in respect to their movements, are expected and ordered to visit the Dang forest at stated periods, viz. the First to make separate visits of fifteen days each in April and May, while the Second Assistant is ordered to remain in the forest from the beginning of the season at which it can with safety be entered (viz. 1st March), and to remain there until the rainy season is at hand.

Duty of the Northern Officers to see that the Forest Boundaries are carefully kept, and that the Dang People do as little damage as possible.

123. The duty of both these officers is to see that the boundaries of the forest, as rented by the Government, are kept intact, and that the savage inhabitants do as little damage as possible by the practice of destructive cultivation, which is one of the great sources of ruin in this as well as in other forests.

124. The eastern border of the Dang was until 1849 or 1850 very imperfectly guarded

from depredation. The care of the conservation of that quarter was supposed to be vested in the Komavisdar of Baglan and his subordinates, but it was by experience found that several of these officers rather connived at, if indeed they did not openly assist in, an organised system of annual plunder, which was carried on to a great extent. Since then an establishment has been entertained, under the direct control of the Conservator, to watch during the open season that side of the forest, and to see that advantage is not (as was formerly the case) taken of the proximity of the Soolgana Deshmook's territory to export wood really cut in the Dang under a permit from that Deshmook as having been cut in his country.

Measures for guarding the Eastern Border of the Dang.

125. The Conservator has had it in contemplation permanently to station the Second Assistant in the country above the Ghauts immediately overhanging the Dang, but circumstances have hitherto prevented this plan being carried into effect. In the meantime it may be observed that so long as he is stationed in the lower country his services are available only for about three months out of the twelve.

Advantage of locating the Second Assistant on the Eastern Border.

126. It is also a part of the duty of the First Assistant in charge of the Northern Branch to keep an eye on some detached pieces of growing forest not included in the rented Dang, such as that in the country of the late Mandvee Raja, a rather extensive and promising plantation at Chinchye, on the Par river, 16 miles south-east of Bulsar, and detached patches of Teak vegetation on the hill-fort of Parnera, and on a few of the hills south-west of Bugwarra.

The Northern Assistant also enjoined to look after detached Pieces of Forest beyond the Dang.

127. The officer of this department furnishes all the northern timber required for naval purposes, and also for other public purposes at the Presidency; likewise what is required for Sind,

Supplies furnished by the Northern Assistant.

Ahmedabad, Deesa, and other northern Stations, with exception of rafters, which are supplied from the growing forests under the immediate charge of the Conservator.

Mode of Conducting the Timber Supply.

He makes his advances to the Ryots of the Attaveesee between the 1st October and the end of November, and these parties forthwith proceed into the forest to cut, bringing the cut material on carts between the beginning of January and the end of March, according to distance. Of the quantity received, the most choice logs, the crooks, sotas, and bamboos, are selected for the public departments at the Presidency; a portion is set aside for despatch to up-country Stations, and the most inferior portion of the supply is sold either by auction or by private bargain (according to the aspect of the market), to persons building country vessels, or to dealers at Billamora and other places.

Rate of Charges made by the Northern Branch.

The rate at which credit is taken by the Northern Department for the quantity furnished is for selected timber 35 per cent. in advance of the market price, and for common timber of the same scantling and for unselected material the market price, as near as that can be ascertained.

Annual Meeting with the Dang Rajas.

128. The First Assistant attends the meeting of the Rajas or Chiefs from whom the Dang is rented, and who are assembled before the Political Agent (the Collector of Khandeish) at Moolere, or elsewhere on the eastern border of the Dang.

Payment of the Annual Rent by Government.

The instalment of the Dang rent (Rs. 11,010) is then paid them by the Assistant Conservator in presence of the Agent; complaints are heard and investigated, and fines for breach of the forest contract are when necessary imposed.

Beneficial effects of the Dang Rent in a Political view.

129. Thus the plan of renting this fine timber tract for the sake of the forest it contains has had a most beneficial effect in a political point

of view, viz. as to keeping these savage Chiefs quiet, and has tended to save probably more than the total of the rent which has been paid since 1841, in rendering unnecessary expensive expeditions to put down the outbreaks which were previous to that time of periodical recurrence.

Expense of Military Expeditions into the Dang, and increase to the Pension List caused by them.

These expeditions were not only expensive on account of the commissariat supplies which had to be carried with a force operating in a country which afforded nothing for soldiers to eat, but still more so in the number of men who, from the unhealthiness of the climate, became affected with organic diseases, and had on this account to be speedily transferred to the pension list.

Difficulties arising out of the Shares of the Gaekwar in Dang Villages.

130. One considerable source of annoyance and dispeace still continues, viz. the continually disputed claims as to shares of villages alienated, or said to have been, to the Gaekwar authorities for trifling sums, and indeed often for no compensation at all. This keeps up a divided rule, unfriendly to peace and effectual control.

Several late attempts at a renewal of these schemes of transfer have been promptly repressed.

Bad effects of giving up the Rights the British Government held on the Fort of Saldheir.

It is believed that the making over the whole Surdeshmookhee rights in the fort of Salheir to the Gaekwar's control (a step taken about twelve years ago) has done much to increase the number of those disputes.

It appears not to have been seen that the transfer of the supremacy over a part of a fort which overlooks and commands the Dang country, though it might be a matter of no moment to the British Government, was yet a measure which gave to our subject ally a prestige in the eyes of those rude people such as he had not before enjoyed.

Pecuniary Results from renting the Dang Forests.

131. The pecuniary returns from the Northern Agency have hitherto seldom shown a balance

to credit after paying the Dang rent and all other claims, but the deficit has never been heavy, and has been more than compensated by the benefits of the measure.

Heavy Duties levied on our Timber in passing the Chowkees of the Bansda Raja and the Gaekwar.

132. One great cause which continues to enhance the price of the timber of these forests is the heavy duty to which it is subject in transit where the road necessarily passes through a corner of the territory of the Gackwar or the Bansda Chief. This impost amounts to Rs. 3-12-0 per cart—a heavy rate when it is considered that it is paid for timber cut in our own forest, and paid to subject allies, whose produce is allowed to pass through our territory without any duty except the trifling Chouth levied in the Mhowa Purguna. Were this duty removed, northern timber would not only be considerably cheapened, but the Agency would invariably show a balance to credit.

These Duties levied from us, while all the Produce from the Forests of these States passes through our Territory free.

Great importance of a good Road through the Dang.

133. A road through the Dang, judiciously constructed, might not only enable us to avoid these oppressive imposts, but give to jungle timber, now not worth exporting, an immediate value, and enable us effectively to minister to the wants of the railways now in progress.

Impossibility of floating Timber by the Rivers in the Dang.

It is necessary to mention that the several rivers which traverse the Dang are too much encumbered with great rocks and stones to allow of their being made available for the floating of timber.

Southern Branch; details of Management.

134. I now proceed to explain the system pursued in the Southern Branch of the Timber Department.

This is managed by an Assistant to the Conservator, who has his head-quarters at Sudasheoghur, the northern seaport of North Canara.

In order, however, fully to explain what the duties of this officer are, it is necessary that I should give a short history of the appointment.

Previous to 1836 the Bombay Government had, from the period of the abolition of the Forest Conservatorship in Malabar and Canara, purchased the timber required for the Dockyard and other public departments through private agency in Malabar.

From Canara there was, during this interregnum, no supply, because the Canara forests below the Ghauts north of the Tuddry were nearly exhausted as regarded Teak timber.

Causes which led to the appointment of a Timber Agent for Malabar and Canara.

Owing to this, and to other causes, the price paid for contract supplies was found to be so heavy that the Naval Department recommended the appointment of an Agent solely for this duty.

Accordingly Captain Williams, I. N., was entrusted with the charge, and continued to carry it on until his departure for Europe.

Failure of the attempt to work the Palghaut Forest.

Captain Williams chiefly confined his operations to purchase, but he also attempted to work the Palghaut forest by direct agency; however, owing to causes which need not be dilated on here, he was unsuccessful.

Failure of first attempt at Supply from the Anamalla Forest.

He also attempted, in concert with the Collector of Coimbatore, to carry into effect a plan for the supply of timber and plank from the Government forest of Anamalla, which forest is in fact a continuation of that of Palghaut; but this scheme also, owing, it is belived, to the rascality of the Malabar dealers, failed.

Captain Williams found it necessary, in order to carry on the business of receiving Poon spars by contract, to apply for an Assistant. The late Mr. Poulton was sent by Sir Robert Oliver for this duty, on a small salary, or about Rs. 140 per month.

Reasons which led to the appointment of Mr. Poulton as Assistant to Captain Williams.

It soon, however, appears to have become apparent to Captain Williams that Mr. Poulton's services might be applied in a more extended

field, viz. to pick up the remains of Teak forest still left in Lower Canara, and to supply these direct from the ports there, in like manner as the Poon spars were furnished from Cassergode and other places south of Mangalore.

Profits of the Timber supplied from the Government Forests in Canara and Soonda.

Mr. Poulton accordingly was ordered to make Sudasheoghur his head-quarters, and from time to time he extended his incursions into the interior, with so much success in procuring a supply of wood that I estimated in 1849 the profit to the State on the timber so furnished at about Rs. 23,000 per annum.

Mode in which these Profits were calculated.

I should here explain that the forests from which this timber is cut being the property of the Government of Fort St. George, the produce was made over to the Bombay Government at cost-price, and the difference as above calculated represents the additional sum which Government must have paid had these supplies been made by a contractor. Mr. Poulton also had shown himself indefatigable in exploring the forest above the Ghauts in Soonda, and in arranging for a supply of timber from thence; and it was found that this timber was considerably superior to that which had been procurable below.

Destructive effects of a permission which had been given to the Contractor.

135. Further, in 1845-46 a practice was put a stop to which annually caused a serious loss to Government. The contractor who had been in the habit of bringing down the Government supply of timber from the interior had liberty to reserve for his own use all the broken and burned logs which he found in the forest. The consequence was that logs were frequently half burned, and at other times were launched down steeps with the certainty of their being broken by the fall. On either of these contingencies occurring they became the property of the contractor.

Permission annulled in 1846.

The subject was taken up by me on the suggestion of Mr. Poulton in my forest report for

1844-45 (*vide* paragraphs 18 and 19), and measures were forthwith taken by Mr. Blane, then Principal Collector of Canara, to abrogate a privilege so destructive to the property of the State.

Large Sum realised by Sale of Rejected Wood.

The result has been that a large sum has since been realised by the transport to and sale at the coast depôt of great quantities of this wood, which must otherwise have been lost to Government. It is brought to the coast by a contractor, who receives from one-third to one-fourth of the sale proceeds, according to distance, &c., and the remainder is clear profit to the State.

Proposal to reduce Mr. Poulton's Salary abandoned.

136. After Mr. Poulton had taken charge of the Canara appointment his salary was raised to Rs. 300. Some years ago a reference was made from the Honorable Court in the view that this salary might be reduced to its original standard of about Rs. 140, but satisfactory reasons were given for maintaining it at the rate fixed by the Bombay Government.

137. In 1852 a further modification took place in the duties of this appointment. As the Bombay Conservator had made repeated journeys through the upper forests of Soonda, as well as in those below the Ghauts in North Canara, he had occasion to observe the very great destruction of timber which was continually taking place—a destruction which seemed likely to be checked by the efforts of an officer in charge on or near the scene of these depredations.

Mr Poulton's Appointment placed on a new footing in 1852.

Accordingly, after a considerable quantity of correspondence had passed between the different Governments, and when it had been fully and satisfactorily shown how important these forests from their situation were, for the supply not only of naval timber, but for the increasing wants of the great agricultural countries, Dharwar, Belgaum, Bellary, &c. to the north and east of them, the Supreme Government was in 1852 pleased

to sanction the appointment of Mr. Poulton as an Assistant Collector (for forest purposes) to the Collector of Canara. This sanction took place in March or April 1852, and the result was that Mr. Poulton had, in addition to his duties as Assistant Timber Agent, those of forest supervision, for which increase of labour he received from the Government of Fort St. George a monthly salary of Rs. 200, with travelling allowance of Rs. 3 per diem when moving about in execution of his forest duties.

The new Appointment tended to neutralise inconveniences formerly experienced under a divided Agency.

This increase neutralised the inconvenience which had been experienced from Mr. Poulton carrying on the same duties as Captain Williams had done on a salary much inferior; for on the departure of Captain Williams in 1849 the appointment of Timber Agent had ceased, and the control of Mr. Poulton's office had been vested in the Conservator.*

Mode of conducting the Duties of the Southern Branch.

138. Under the existing constitution of the branch, the incumbent devotes a part of the season to visiting Malabar, purchasing such timber and spars as may be required, either there or at Mangalore, and takes over and measures the Teak plank which is now regularly furnished from the Government forest of Anamalla for the use of the Naval Department. This plank, which is of very superior quality, and gives a considerable net profit to Government, is delievered over at Ponany, measured there by the Assistant Agent, and afterwards shipped for Bombay. The Assistant Agent, or Assistant Conservator as he is now termed, on his return to Sudasheoghur,

* This arrangement has been cancelled since January 1856 by the Government of Fort St. George having appointed an officer of their own to the charge of the Soonda and Canara forests. As yet his new plan has been most unsatisfactory in its results

lots and measures the Government timber brought from the Soonda or other forests, and arranges for its shipment to Bombay, making over the inferior lots to the Collector's department for sale by public auction, which usually takes place in October. After this has been effected, and the rains have spent their first violence, he makes a tour to the interior forests, including the upper forest of Soonda, arranges for the cuttings of the season, and performs his duties as local Conservator, on observing and reporting any breaches of the forest rules.

Bad effects of Mr. Poulton having no direct Control over the Revenue Officers in Forest matters.

139. It is to be regretted that Mr. Poulton had been vested with no direct control over the local revenue officers who had charge of the forest farms, &c., as in this case his appointment would have been attended with results of a more decided character.

Establishment of the Office of the Southern Branch for Canara.

140. The establishment of the Assistant for the Southern Branch consists of an office at Sudasheoghur, with an English Writer, several Peons, and Measurer.

Establishment in Malabar.

That for Malabar embraces an Accountant and Peons at Calicut, and a Mootsudee at Ponany, for the purpose of registering the plank received there, and also for keeping the accounts of timber purchases which have occasionally to be made at that place.

Supplies made from the Southern Branch.

The Agency furnishes the main supplies to the Bombay depôt, and also provides for the requisitions from the Arsenal and Commissariat at Belgaum and Dharwar, and from Kurrachee, Hyderabad, and other places accessible to supplies made by means of water carriage.

The Gun-Carriage Department at the Presidency has also from hence a source of provision distinct from that made to the Naval Department and Grand Arsenal.

Central Districts managed by the Conservator himself.

141. The third part of the conservation system is the main or central one, managed by means of the Conservator himself.

Department when organised.

The institution of this office dates from 22nd March 1847, but there had previous to that time, and indeed from 1840, been in progress measures for the organisation of a general system of forest conservancy. The orders of Government issued in 1839 and 1840 to stop the cutting of Teak wood were the first step to this plan.

Different Tours made by the Conservator between 1840 and 1850.

142. In 1840 the present Conservator was detached on a tour of inspection to view the northern forests, their present state and capabilities.

Again in 1841 the same officer made to Government or the Revenue Commissioner a report on certain forest tracts nearer the coast in the Northern and a part of the Southern Konkun which he had then visited.

In 1842 he undertook a small experimental thinning of forest in the Anjerla quarter of the Sooverndroog Talooka.

The result of this was sufficiently encouraging to warrant an extension of the system in 1843; and these measures, joined to others connected with the increasing circle of the conservation, were gradually amplified from year to year.

Between 1843 and 1846 the southern forests in Soonda and North Canara were also twice visited, and arrangements proposed for their better conservation. All these details will be found in the forest reports published in 1852, and embracing a period from 1840 to 1850, but necessarily in a scattered form.

143. During some years previous to 1847 the present incumbent had been carrying on the duties as interim Conservator, this title having been given because, although the appointment of Conservator had been recommended to the

Supreme Government in 1845, war and other contingencies had prevented the subject being taken up until 1847.

Sanction of Supreme Government to Conservator's appointment in 1847.

From the 22nd March 1847 the appointment of Conservator was sanctioned by the Supreme Government, and a small establishment was allowed, sufficient to carry on the duties of the office. With the extension of these, the establishment of foresters, &c. has been gradually increased, according to existing requirements, the more so as the progress which the forest in many parts of the country had made called for a stricter supervision, and also because the net profits realised in each year showed with certainty that fuller supervision would be attended with more ample returns, and that there was no cause of apprehension that this increased expenditure would cause any disbursement which would not be more than covered by the receipts.

Jungle Fee System established in 1850.

144. In 1850 the duties of the Conservator were considerably enlarged by reason of the Government having devolved on him the organisation of a scale of fees on jungle timber.

It is here necessary to explain that on the abolition of the transit duties in 1836 a number of levies which had been previous to that time made on forest, and which were really a seignorage and had nothing to do with the transit duties, except that they had been levied by the same establishment, were by mistake abolished, and for some years a correspondence had passed through different offices as to the most eligible mode in which they could be reimposed.

The Conservator suggested that the best plan seemed to be to impose them in such form as might be agreed on, and that the representations of parties affected by them would soon serve to indicate where inequalities existed.

This was accordingly done, and the fee system, as settled in January 1852, has since worked satisfactorily, producing an annual revenue varying from Rs. 32,000 to Rs. 35,000 per annum.*

Colaba Forest added to the Conservator's charge in 1852.

145. In 1852 a further addition was made to the duties of the Conservator by investing him with the direct control of the forest in Colaba, Alibagh, and what may be called the infant forest in the kingdom of Sattara.

Visits of the Conservator to Sind.

Also between 1847 and 1851 the Conservator had twice to visit the Sind forests in order to see the effects of the system then in force, and to propose any amendments which might be deemed beneficial; and it is expected that he shall from time to time visit that province with the same object in view.

Conservation in the Rutnagherry Collectorate in 1854.

146. Again in 1853 the measures which had been so judiciously taken in the Rutnagherry Collectorate by Mr. Coles, the Collector, in fulfilment of the objects sought for by a repeal of Mr. Dunlop's proclamation of 1822, rendered repeated references to the Conservator a matter of urgent necessity; and after several visits made to the Collectorate a system of foresters, similar to that kept up in the Tanna and Poona Collectorates, was organised in 1854, and this without any additional charge to the State, as the savings made in the office establishment of the northern and southern branches more than sufficed to cover the increased expense.

Charge of the Naval Timber in Bombay made over to the Conservator in 1854.

147. In June 1854 a further addition was made to the duties of the department, owing to the charge of all the naval timber stowed in Bombay being made over to the Conservator.

The details, the correspondence, and the references necessary in this branch occupy a great deal of time, and it is not clear that the extent of

* During the year 1856-57 the farm of the fees has risen to upwards of Rs. 66,000 per annum.

responsibility incurred may not be something more than inconvenient, as an officer engaged in duties often very distant from the Presidency must leave a great part of the detail to his Assistant, a European officer, in immediate charge.

Mr. Williams appointed Assistant in 1854 for the Bombay Branch.

The Government, however, having granted to the Conservator the services of an officer long and meritoriously employed as Assistant in the forests of Sind, any cause for alarm as to the danger of the trust has been hitherto avoided, and it appears probable, when all the timber now scattered from the further end of Colaba to Mazagon shall have been collected into one depôt, that the facility of supervision and detection of errors in detail will be materially increased, while there can be no question that the arrangement as regards economy and efficiency, in having requisite supplies of material always ready, will be considerably augmented.

148. Further, under the present system we shall be able to estimate accurately the amount which ought to be charged as a percentage on timber issued to private parties or to public departments—a measure which till now could not be carried out, inasmuch as the expense attending office establishment, and the large labour gangs constantly required for stacking and unstacking the great logs, could never be reckoned with any approach to accuracy, seeing that this establishment had also the duties of the Naval Store Department generally to carry on, which duties might one day occupy one-fourth of their time, and on the following day three-fourths, rendering the attempt to strike an average quite out of the question.

149. The latest additions made to the duties of the Conservator have been—

1*st*.—The charge of the Babool forest reserves

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lately begun to be formed in the bare parts of the Southern Maratha Country; and

2nd.—The arrangements for the Conservator taking under his immediate charge the forest reserve establishment of the Dharwar Collectorate.

The variety of his other avocations, however, has hitherto prevented his doing more than taking the mere preliminary steps for extending his charge in these directions.

150. Another branch of the Conservator's duty connected with forests is that of planting trees by the side of the made roads, for which a sum of Rs. 3,000 is annually granted by Government.

This duty requires a separate set of accounts and establishment from that of the forests, and also been lately extended, owing to the supervision of all the local grants heretofore made in different Collectorates for this purpose being now (under order in Council of September 1855) vested in the Conservator.

System on which the Conservator's Duties are conducted.

151. I now proceed to explain in some detail the system on which the Conservator's duties is carried on :—

1st.—For the office establishment are one English and two Marathi Writers.

Establishment of Forest Keepers.

2nd.—For the protection of the different forests within the Conservator's immediate charge, embracing those from the Damaun river to the Sawunt Waree border below the Ghauts, and above the Ghauts from the north of Khandeish to the northern border of the Madras Presidency, one or more Forest Peons are entertained for each Talooka in which there is forest, forming a total of about 60 Muccadums and Peons, with one Jemedar, one Havildar, and a Karkoon for each of the two principalities of Colaba and Sattara.

152. Besides this it often becomes necessary

to put some additional hands on, particularly at the season when forests are lopped by the Ryots to give material for burning on their fields.

Additional or reserve Hands often necessary for supplying Casualties.

153. All the contingencies arising out of sickness, &c., to which many of the establishment are, owing to their location, liable, renders it requisite often to have a reserve for the filling up of places temporarily vacant. For all these expenses a contingent allowance, amounting to Rs. 328 per month (exclusive of the Dharwar and Bheemthuree establishments), has at different times been sanctioned as necessity arose.

Contingent Allowance.

Deficiencies how supplied when necessary.

154. The charge incurred is somewhat in excess of the allowance made, but the deficiency has hitherto been supplied from a reserve, arising out of certain recoveries, such as those from the Conservator's share of the Gornehr profits, repayments from Peth Hursool, &c., and at other times Muccadums on the strength of the contingent allowance having been temporarily appointed to superintend the cuttings within the limits of their range, cease, so long as the cutting and sale operations go on, to be a charge on the contingent fund, and are paid from the amount sanctioned for forest cuttings, &c.

Confusion in the Accounts how avoided.

In this manner we have hitherto managed to make the contingent allowance cover the expenses of Karkoons, Jemedars, Peons, &c.; and as all the expenditure of the annual sanction is clearly shown in the accounts rendered every six months, it is presumed that confusion is thus in as far as possible avoided.

Mode of dealing with Cash sanctioned for Expenses.

155. The sum sanctioned annually for forest cutting and other expenses connected therewith is quite distinct from the contingent allowance. It is drawn in even sums, varying from Rs. 1,000 to Rs. 5,000 as required.

Immediately on sanction being received, the

cash is transferred to the Bank of Bombay by the Conservator, to his public account with that institution. Sums required for the expenditure in different quarters are drawn as wanted by means of cheques payable to the General Paymaster, who in return for these cheques sends to the Conservator bills on any Collectorate in which they may be required for current expenses. By this means a double record is secured, and by a reference to the cheque-book at the end of the season, the sums paid for operations in the several forests can at once be picked out and compared with the accounts rendered. To obviate inconvenience from loss of or accidents to cheque-books, a register in Marathi of the different payments is also kept by the Karkoon at head-quarters.

A Marathi as well as English Register kept of all Payments.

156. Also in regard to the distribution of the pay from the contingent allowance. This is effected by crediting the whole amount of the expense bill for each month when passed to the public account of the Conservator, who furnishes to the General Paymaster a cheque embracing the whole amount for the foresters in several Collectorates in which pay has to be distributed.

Arrangements for timely Issue of Pay to Foresters monthly.

That officer returns bills for each, which are duly forwarded, so as to (as a general rule) ensure the pay bills for the preceding month being forwarded before the 20th of the current one. An occasional exception to this takes place when the Conservator happens to be in distant provinces, or in wild parts of the country, where the advent of the post is rare and irregular.

157. The provision of crooks and knees from the Kolwan forests was until last year a branch for separate sanction, but the Conservator has now found it more convenient to amalgamate it with the general one.

Realisations on ac-

158. All realisations in the several Collec-

torates on account of forest are since 1st May 1854 remitted to the credit of the Conservator with the General Paymaster, as is also the amount of fines for wood stolen or plundered, minus the share of fine which, under the order of Government of 5th May 1849, is given to the informer.

count of Forest how credited.

159. The pay of the Jemedar of the establishment is Rs. 15, that of the Havildar Rs. 9; Muccadums receive Rs. 6 each; Peons from Rs. 4 to Rs. 5, according to locality and qualification.

Pay of the Jemedars and Peons.

160. Those in the most unhealthy districts have Rs. 5. per month; the general rate in other districts is Rs. 4, except in cases where the individual can write, when the pay rises to Rs. 5.

161. Besides the abovementioned Establishment for the Teak and Seesoo forests, the Conservator has to keep up rather an extensive floating or temporary establishment for the supervision of the jungle fee system.

Jungle fee Establishments.

Previous to May 1854 this branch was entertained through the medium of the Komavisdars of the several Collectorates in which forest fees are levied, and these officers paid the parties employed out of the fees as they were collected, carrying the balance to the public account.

Formerly kept up by the Komavisdars, and paid from the Fees.

Since May 1854 the payment of the whole of these persons is vested in the Conservator, and the fee proceeds entire, as received, are remitted to the forest credit with the General Paymaster.

System changed since 1854.

This system gives rise to a great deal of additional labour, inasmuch as sanction is required for the entertainment of any additional hand who may be on the necessity of the moment employed.

Much Labour and Detail caused by the change.

162. The forest fees are generally disposed of in farm, except in lesser divisions and particular localities, when the collections are made under direct management.

Fees generally farmed.

Arrangements for the extension of the Fee system to the Poona and Ahmednuggur Collectorates.

163. The extension of the fee system to the Collectorates of Poona and Ahmednuggur has been arranged, but the active measures for organising the same have yet been hardly entered on, and indeed it seems difficult to provide for the direct superintendence of these by the Conservator, or for the management of the extensive correspondence which must arise consequent on their introduction, without additional machinery for the detailed work.

Arrangements for fixing the Boundaries of Jagheer Villages in concert with the Revenue Survey Officers.

164. Another branch of the Conservator's duty is to assist in arranging the boundaries of Jagheer and Inam villages which contain forest. For this purpose he has a Karkoon attached to each of the Surveys now in the Konkun. It is the duty of this functionary to report to the Conservator any difference between the boundaries of these villages as effected by the decision of the Survey and the limits which may have previously existed. It is his duty also to give to the Survey Officer, in as far as he can, any information which he may have collected as to the former bounds of jurisdiction.

Karkoon for assisting to fix the Forest Reserves in the Rutnagherry Collectorate.

165. A Karkoon also attends the Survey now in progress in the Rutnagherry Collectorate, for the purpose of assisting to fix the forest reserves which it is proposed to establish in a small portion of the lands of each village.

Also in the Ahmednuggur Collectorate.

Another is employed in attending the settlement of the new farms in the western parts of the Ahmednuggur Collectorate, and setting apart, in as far as possible, the lands of each village which are intended to be kept as forest.

Utility of Paper drawn up by Mr. Tytler.

166. Much aid in this respect has been afforded by an able paper drawn up by the present Collector of Ahmednuggur.

These appointments are all temporary, and are renewed every six months.

167. The above may be deemed sufficient for giving an idea of the system by which the Conservator's operations are carried on.

Rules in the Conservator's Department.

I now proceed to add such of the Rules by which the operations are guided as may be necessary to be known :—

Teak and Seesoo are Government Royalties ; exceptions made under a Supplemental Rule of the Revenue Survey.

1*st.*—Timber, Teak and Seesoo being Government royalties, it is the duty of the Conservator to set apart spaces containing these woods, and to hold them excepted from the operation of the survey rules, in conformity to the supplemental rule published under authority of Government on 23rd May 1851 ; such exemption to be in all cases where it may be practicable declared within a year after the survey has been made.

List of excepted Villages to be furnished to the Collector.

The Conservator to furnish to the Collector of the Zilla a list including all such villages or parts of villages; this list to be amplified from time to time as reason may be seen for doing so.

Exceptions.
Claims established under the Proclamation of 1822.

2*nd.*—From this royalty are excepted the trees grown in the garden grounds of Khotes and others in the Southern Konkun who have made good their claims to property in these trees under the proclamation of June 1851, repealing that of Mr. Dunlop of 1822.

Trees growing within the House Precincts of Cultivators and others.

3*rd.*—All trees growing within the compound precincts of cultivators are given to them on their making known the existence of the same, but they are not at liberty to cut these trees except at the proper season, viz. from 15th August to 15th January, and they must agree to plant in the ensuing rainy season two trees for every one they cut down.

This latter clause applies also to the parties mentioned in Rule 2.

Rules as to Cutting by Inamdars who have the privilege of Forest

4*th.*—Inamdars and others who have Sunuds conveying the right of forest are nevertheless not to cut nor to give contracts for cutting the same

except at the proper season; and previous to the commencement of their cuttings they must give notice to and obtain the permission of the nearest local officer (Komavisdar or Mahalkuree), in order that the bounds of the Government villages in the vicinity be duly watched and looked to by the Village Officers and Conservator's Peons.

Occasional Donations to Public Buildings in Villages.

5th.—On occasion of any cutting of Teak being carried on in a forest village, the Conservator is authorised, under order of Government of 1852, to give to the village, on petition being made for the same, a moderate supply of rafter or other timber for the repair or construction of village public buildings.

Any parties convicted of diverting timber thus granted to their private use, or selling the same, to be dealt with according to law.

Responsibility of Khote Shareholders for the Forest in their Villages.

6th.—Khotes or others to whom shares of the village forest have been, under the proclamation of June 1851, granted consequent on their acceptance of conservation warrants, are to be held in as far as possible responsible that their pieces of forest are duly attended to and trimmed at the proper season, they receiving the benefit of all the smaller wood which may be cut for firewood or for burning on their fields. In cases where these parties decline to trim their trees, the Conservator's Agents may do so, deducting the expenses thereof from the amount of their share.

Darekurees to be dealt with by the Khote Shareholders.

They are to arrange the distribution of this in such a manner that Darekurees and other Ryots shall have no cause to complain to higher authority of having been deprived of their due share of this material.

Mortgagees not permitted to Alienate the Forest of their Villages.

7th.—Under Government order of 1852 it is ruled that where Khotes have occasion to mortgage the villages they hold, they have not the

power to include the forest which is royalty in the said mortgage.

8th.—In addition to the conservation of Teak and Seesoo for Government purposes, the Conservator may direct the conservation of certain other descriptions of timber or pieces of forest, either for public use or for the prospective benefit of the people.

Other descriptions of Wood besides Teak and Seesoo may be reserved for public use at the discretion of the Conservator.

Thus in certain parts of the country, as for example in the Kolwan Talooka, Tewus or Tunnus. wood is not to be cut without a license, and villagers burning trees of this wood in the course of their destructive cultivation, or Dulleeran, will be held liable to the same penalties as those in force for cutting Teak or Seesoo.

The reason for this restrictive rule is that though Tewus is not supplied to the Naval Department except very rarely, it is a wood of great utility to the cultivator for ploughs, yokes, &c., and also to the makers of carts.

Penalties on the Destruction of Tunnus Wood.

So also the River Jambool (Jambosa salicifolia). The copses of this wood, which are numerous in the upper country, and usually occupy the shifting beds of rivers, furnish a superior material for house rafters. These are cut in the dry season, and sold at a cheap rate to the neighbouring cultivators. The copses of this wood are preserved as Government property where found in waste places near brooks and streamlets, and also in river beds, the limit of the Government claim in such being by old usage the greatest extent to which the freshes of the rainy season rise.

Water Jambool.

9th.—Permission to cut jungle timber when such is required for houses, bullock-sheds, granaries, &c. is obtained by private parties in the Konkun and Deccan by application to the Komavisdar or Mahalkuree; and such timber, whether

Permission to cut Jungle Timber must be obtained from the Komavisdar.

used in towns, villages, or hamlets, within the Konkun limits, is not subject to any fees.

Exemption of Non-Cultivating Classes from Fees only temporary.

It is, however, to be understood that the exemption of traders, artisans, and other parties not engaged in agricultural pursuits is intended rather as a temporary than as a permanent measure.

Rule regarding Timber for Export.

Persons desiring to cut timber for export must receive a written permission from the Komavisdars, who are enjoined to except from this permission the portions which have been set aside as village forest.

Penalties for cutting without License.

Parties cutting down building timber without license are liable to fine and confiscation of implements.

Season for Cutting Teak and Seesoo.

10*th*.—The season for Teak and Seesoo cutting is confined to that between 15th August and 15th January.

Season for Cutting Jungle Timber.

Jungle Timber may be cut until the end of February.

Season for Trimming.

Trimming to be undertaken at any time between 15th August and the end of February, but no later.

Mode of disposing of fallen and Old Wood.

11*th*.—Dead wood, Teak and Seesoo, in the forest, consisting of fallen trees, old wood left from former cuttings, and such like, may be annually obtained in the larger forest Talookas by parties offering to receive a license at so much per cart. The rate this year in the Kolwan forest is Rs. 5-5-0 per cart. In jungles where the fallen wood is inferior in quality, or more scattered as to situation, the rate offered will be less than the above.

Agreements for Trimming on Security given.

12*th*.—In certain cases, where the heads of villages or the principal cultivators are persons of sufficient substance or good character to be entrusted with the trimming of the Teak forest which may be within their bounds, agreements are taken from them for the trimming of the same

within the regulated period, but generally on a monied security of Rs. 200.

Rules as to Dulleeran or Koomree Cultivation.

13*th*.—No Dulleeran or Koomree (for the destructive cultivation is called by both of these names) to be undertaken without the express permission of the Komavisdar or Mahalkuree, and these officers are enjoined to cause the same to be confined in as far as possible to spots containing wood of little value. Where there may be trees of Teak or Seesoo in the ground, these are to be kept from the action of the fire, either by clearing away the grass and burning materials for two yards around each tree, or by heaping stones to a smaller distance around it.

Penalty for destroying Teak or Seesoo in Dulleeran Land.

The penalty for destroying trees in such cultivation has been fixed at Rs. 2 per tree, but the difficulties found in the strict enforcement of this rate have hitherto been great. As this is one of the most important points in the conservation system, it must always be kept in view, and probably might be materially promoted by a special circular from Government.

Gheras of Hill Forts to be reserved as much as possible for Forest.

14*th*.—The "Gheras" or slopes surrounding hill-forts, which were in the time of the Marathas, &c. chiefly retained in forest for the use of the garrison, are now, under order of Government of 1848, to be in as far as possible reserved for the growth of timber (Teak, Seesoo, and Junglewood) intended for Government purposes.

It should be observed also here that many difficulties have hitherto occurred in bringing this rule into general application, but it is to be kept in view and enforced in all practicable cases.

Order of Annual Proceedings in the Forests.

15*th*.—The time for cutting Teak is, as before mentioned, from 15th August to 15th January. Previous to the former period the Conservator has his Muccadums and Agents ready to proceed to the several forests. The directions generally given

to them are to cut five thousand sticks of different descriptions of younger trees for rafters; that these are to be cut where the forest is thickest, and nowhere so as to leave a place bare.

Rules as to trimming, when carried on by the Conservator's Agency.

That so soon as the cutting shall have been finished and the wood barked and heaped, they are then to begin on the trimming of other trees in situations where such trimming is required, it being a well understood matter that where the trees grow in deep gullies, they gather all their strength for shooting up to the light and air, and therefore throw out so few side branches as not to require trimming.

When (as is often the case), on account of the advent of the harvests, labour is not immediately procurable for carrying on the trimming, this is in such case deferred till the 1st December, and then carried on for about two months, the rule being that for every tree which has been felled, from four to five shall be trimmed into growing condition, that giving a number varying from 16,000 to 20,000 trimmed in each piece of forest.

Rules as to Correspondence with Collectors and their Subordinates.

16*th*.—In all cases where foresters are located, or forest operations are carried on in any Talooka, the Conservator corresponds direct with the Komavisdars in all matters relating to forest, such as cuttings, fines, sales, exemptions, &c.; but in any case where forest measures have to be taken with the chance of their affecting the revenue or police arrangements of a Talooka, the Conservator in such instances avails himself of the opinion and concurrence of the Collector previous to issuing any orders.

Rules as to Cutting Trees in Reclaimed Land.

17*th*.—In certain cases, where parties have at some expense levelled, banded, and filled in a piece of ground for the purpose of extending their rice cultivation, the Collector or Komavisdar reports

to the Conservator that a certain number of Teak trees in the ground require to be cut away and rooted out, whereupon arrangements are made accordingly, due care being by investigation taken that the improvement is *bonâ fide* a solid one.

Assistance afforded to Villages suffering from the effects of Fire.

18*th*.—In cases where villages happen to be destroyed by fire, and a portion of Teak forest is required for their renewal, report is made to the Conservator, who does his best to furnish from the neighbouring forest a supply of wood at a fitting season.

Mode of dealing with Forest Offences.

19*th*.—All cases of theft in or trespass on the limits of forests are ordinarily judged by the Police Amuldar of the District, except in occasional instances where the Conservator happens on the spot to observe any furtive or wanton infraction of the Forest Rules, when he himself disposes of the case in his magisterial capacity.

Share of Fines paid to Informers.

20*th*.—Of fines realised by the punishment of offenders against the Forest Rules, half is, under order of Government of 1849, paid to the informer, whether he be a Government officer or private person.

Monthly Report of such Fines made to the Conservator.

A report is made by the Police Amuldar of the Talooka to the Conservator monthly of the amount of all such fines, with the name of the party who brought the delinquency to the notice of the Amuldar; whereupon, on the face of the same return, a note is written to the Magistrate, requesting that he may, after the expiration of the usual term allowed for appeal, order payment to be made to the informer.

Sale of Grass in the Babool Preserves.

21*st*.—*Babool Preserves*.—The sale of the grass as well as other produce of these being vested in the Conservator, he holds an annual auction at the beginning of the rainy season. The grass and grazing privileges are at that time dis-

posed of, and no abatement is afterwards made on account of failure of rain, this being the rule in all such bargains.

Time for Trimming the Babool Preserves.

The thinning of the preserves takes place at a time when the grass has been cut, and there is no risk of injury to it from thinning operations. The beginning of January is the usual time fixed for commencing.

Mode of Thinning, and Material how disposed of.

The most crooked trees and tortuous branches are those thinned out. The wood is lotted partly into firewood, partly into supports for houses, small roof beams, &c., the price varying according to distance from Poona.

Sales of the Babool Pods for Sheep Grazing.

In February and March the sale of the Babool pods and tender branches takes place, the produce of each preserve being separately sold. The shepherds and goatherds are after the sale allowed to pasture their flocks on these branches and pods, and to continue doing so until late in May.

In certain cases considerable expenditure requires to be incurred in removing the prickly-pear from the preserves, as, if it be allowed to spread, the crops of grass sustain serious injury.

The best trees in the Babool forests are kept entire for public purposes.

The above comprise the leading Rules observed in carrying on the conservation system; but it is to be remarked that as the office and its duties have been organised within the last ten years, new cases requiring other provisions may be expected not unfrequently to arise.

ALEXANDER GIBSON,
Conservator of Forests.

Nandoorie, Khandeish, 15th March 1856.

No. III.

PRACTICAL HINTS

ON THE

PLANTING OF ROAD-SIDE TREES.

BY

SURGEON ALEXANDER GIBSON, F.L.S.,

CONSERVATOR OF FORESTS.

REMARKS

ON THE

PLANTING OF ROAD-SIDE TREES.

Preliminary Remarks.

As the Rules relating to this subject must be varied according to the soil and climate of different parts of the country, it may be useful, after mentioning the few general principles applicable to all the provinces, to point out the peculiarities of each, and the variety in procedure which these may appear to call for.

Also to indicate the description of trees which may be with most advantage planted everywhere.

Process.

The first part of the process consists in the excavation of holes, or the building up of mounds to receive the young trees, or the shoots of older trees if it is intended that the growth shall be chiefly from cuttings.

Precautions to be observed in choosing Lines of Road.

In choosing a line of road for the commencement of these preparations regard should be had to that which is likely to be most permanent, and in this view the different lines of made road leading to the main arteries of railway communication should be, when practicable, chosen in the first instance, as it is not probable that anything can occur to divert the course of these when it shall once have been fixed on.

Distances of Trees from made Road and from each other.

In countries where the soil is only of moderate fertility, and where consequently great luxuriance in the growth and spread of trees need not be looked for, the excavations should be made at a distance of 10 feet from the outer edge of the gutter. The distance of one excavation from another should be 25 feet. In countries where the soil is very rich, as in Gujarat, the trees should be from 15 to 20 feet distant from the gutter, otherwise their shade will be injurious to the road, and incommodious to the traveller.

The injury caused to the road will arise from the dropping of rain from the trees allowing water to settle, and from speedy evaporation being prevented by the overhanging of the branches.

Nature of Excavations, &c., and how these are best made.

In a country where the soil is rocky or of the decomposing rock called moorum, it is of importance to prepare, if possible, the cavities intended for the trees a year before the planting is intended to take place, as thus the rain of one season lodges in the holes, and by tending to decompose and break up the strata at the bottom of the pits, makes it the less necessary to dig these of any great depth, because the roots by the time they reach the lower strata will have gathered strength sufficient to penetrate into them when previously softened by a year's rain.

In digging the holes a depth of 3 feet, with diameter of 3 feet, will thus be found generally sufficient.

Advantage should be taken of any heaps of earth which may be found in or near the intended line to excavate there, as it is found that cuttings of the Fig tribe, and indeed all trees, make more rapid progress in such situations than in those where the soil is rocky but perfectly level.

Those places on the line where there is observable solid rock cropping through the surface are

to be passed over altogether, for even if, at considerable expense in mining, an artificial hollow be produced, the roots make no way through the unbroken substratum, or towa as the natives expressively call it.

When, however, the rock is partly solid and partly of moorum, holes may with advantage be dug, as it often happens that in places where, from the look of the surface, a tree could not be expected to grow, the roots find some natural rift or fault through which they make their way, and produce a tree which agreeably disappoints the expectation of the planter.

Planting in Clumps in sheltered situations not advisable.

This leads me to observe that the proposition of Government for planting only in detached clumps in sheltered situations is in my opinion less applicable to the circumstances of the country than the plan now followed. My reasons are these :—

Reasons for the above opinion.

1*st.*—That by confining the plantation to such spots, we lose the advantage afforded by many others which may at first look less promising.

2*nd.*—That these better spots having shelter, and where clumps could be raised are, if of entire ground, almost always found in the previous occupation of a cultivator, who would unwillingly give such land up, or in case the ground be broken, as is very often the case, by the passage of a stream, we can never feel certain that the devious irregularities of its course, swelled as it must be by the occurrence of floods in the rains, may not in one night sweep away the work of several seasons.

For these reasons I beg respectfully to be allowed to prefer the plan which has been from the first adopted, viz. to keep the line as entire as possible, leaving it to the course of several

seasons to show the places where the trees cannot flourish, and where, when they have once or twice died off from having a sheer table of rock underneath, no further expense need be gone to in replanting such places.

Planting in rich Soil.

In countries where the soil is rich and the rock far from the surface, no trouble need be taken in previously making excavations, but the trees or cuttings may be planted out at once.

Limestone.

When however, as is not unfrequently the case, in such countries the upper stratum of soil is at a depth of about 2 feet, underlaid by a stratum of limestone, this should be in as far as possible removed, otherwise it will be most injurious to the tender roots of the trees. In such places it is of advantage to prepare the holes a year previous to planting, as by the settlement of water in the holes the noxious qualities of limestone appear to be somewhat diminished, and a stratum of alluvial soil, deposited from the water, is left between the mineral and the roots of the trees.

Rice-fields.

When it becomes requisite to plant trees along the borders of rice-fields, it is absolutely necessary that some artificial mound should be made when there is no natural mound to take advantage of. Wherever this can be obtained, it should be preferred, even at the risk of some of the trees being out of the straight line.

Rice-fields are in another respect very unfavourable for plainting, inasmuch as they have mostly a soil consisting of about 2 feet of alluvium, overlying a plate of solid rock.

This may be noticed on the sides of the road leading from Nagotna to Mhar, where it appears to me that a plantation could not be undertaken with any hope of success.

Laterite.

In countries having a laterite soil it will often happen that this is quite deep enough to render

necessary merely a hole made at the time of the planting; but in other instances it will be found that a stratum of kaolin or decomposed granite or quartz underlies the laterite, and this requires to be loosened or cleared out to some extent, as, although mostly soft and pasty, it is very impenetrable to the roots of trees, and it also, by reason of its imperviousness to water, is unfavourable to their growth, and causes the roots to rot.

Filling in, &c. of the Holes, or Consolidation of the Mounds.

The holes having been thus prepared, the earth is to be filled into them previous to the first fall of rain, and the unfilled material made moderately compact by beating down, but by no means to a degree which will make it too hard.

The excavated places will be ready for the reception of cuttings, seeds, or trees after the first fall of rain, when the surrounding moorumee ground shall have been somewhat cooled.

With respect to the earth to be filled in, advantage should be taken of the best soil procurable in the vicinity; but if, as is too often the case, only the moorum which has been dug out of the excavations be procurable, in that case endeavour should be used to mix it with the sweepings of the road, which will generally be found collected by its edge, as the said collection has been made when the sweepings were in the form of mud during the previous rainy season. No refuse material whatever should be left out, as the same will all play its part in the process of decomposition.

When it is intended that the trees be planted on raised mounds instead of in excavations, these mounds should be surrounded with two tiers of rough stone, to prevent the earth falling away or being washed away during the rainy season.

I had omitted to mention that in forming the tands for trees, either by means of holes or of

mounds, the quincunx principle should be kept to as much as may be practicable, that is the holes in one line should not face those on the opposite side, but rather medially, thus—

o o o o o
o o o o

This point has, I regret to see, been too little attended to in the plantations I have hitherto made.

Mode and Time of Planting.

The situations for the trees having been prepared in the manner above directed, and the ground sufficiently cooled by a heavy fall of rain, the cuttings may be at once planted, and besides the one cutting placed in each locality, from four to six seeds of other trees should be at the same time dibbled in with a common bit of stick, and each seed so placed that in case of its germination the young plant can be removed, if necessary, by being taken up and planted elsewhere. This cannot be done if the seeds are placed originally very near to each other or in close contact with the cutting. Care should be taken that in planting the cuttings they be inserted to a sufficient depth in the ground, so as generally to have not less than three eyes covered by the soil :—

The seeds should not be dibbled in more than two inches.

Kinds of Trees to be planted, or Seeds to be inserted.

Having thus got the germ of the future tree in the ground, we must before going further indicate the description of trees best fitted for different soils and different parts of the country. And first as to cuttings.

Nandrook; Banyan.

Those of the Fig tribe will be found to be the most generally suited to all soils and climates; but of this tribe some are much to be preferred to others. Thus, though the Banyan will suit any soil, it is not to be preferred to the Nandrook (Ficus Benjemina), inasmuch as it is more liable

to be eaten by cattle than the latter. It also affords a less dense shade, and therefore must be placed in the second rank.

Oomer.

In the third we have the Goolar or Oomer (Ficus glomerata), moderately shady, rapid in growth, and hardy.

Peepree.

The fourth, the Peepree (Ficus tsicla?), which has a spreading head when the soil is of tolerable quality, but is not to be chosen for planting in other situations.

Indian Rubber Fig, why not to be chosen.

I have several times been pressed by gentlemen to extend the culture of the Indian Rubber Fig (Ficus Elastica) by planting it on the roads, but as it has been found by experience that this tree in our climate does not grow well apart from the shelter of houses and other trees, and moreover that it is much more delicate than our indigenous Fig trees, I have always declined to plant it generally. In some parts of the Konkun and of the Dharwar and Belgaum districts, in which the natural moisture of the air is considerably greater than is the case further north, it may answer for planting.

Peepul not desirable for planting.

The Peepul does not appear to be a choice tree for road-sides. It grows up high, but unless the soil be very rich is branchy and scanty in leaf, so that it does not form a good shade, also it is peculiarly liable to be eaten by goats and cattle. Further, it is not easily raised from cuttings, and therefore must generally be planted as a seedling.*

Neem.

Next to the Fig tribe the tree most generally applicable to roads, especially in the upper and inland country, is the Mountain Neem (Melia azadi-

* One point to be here observed is that the cutting intended to be planted should, if possible, be cut from trees in full vigour, instead of from older ones, as those from the latter almost invariably fail.

rachta). It grows well in any soil, and even where there is little or no soil at all, in which latter case it throws out boles or buttresses, like the Olive, round the root; and if these are but supported by a small platform of earth, fenced in with rough stone, the growth of thet ree will be greatly quickened. It is always grown as a seedling, and not from cuttings. As it shoots to head very rapidly after having once got rid of its seedling germ, care should be taken to keep the head shoot from the goats or cattle, which is best done by binding about this loosely a handful of thorns so placed as to enclose the shoot. These thorns are extra to the common hedge which requires to be put around all the trees. In the course of three years, under this treatment, the head of the tree will have reached such a height as to be beyond the reach of the mouths of goats or cattle. After two monsoons the tree requires no watering. Some which I planted in 1849 and 1850 on the road from Akoordee to Dapooree are now shady, seed-bearing trees; also those on the road from the entrenched camp to Hyderabad in Sind show that the Neem flourishes quite as well there as in the Southern Provinces. One advantage of the Neem is that it is little liable to be cut off by rats, which, as will be hereafter seen, are very destructive to some other descriptions of trees.

Cassia Sumatrana (Kasood).

Next in order to the Neem we may place the Kasood, or Cassia Sumatrana. The origin of the name "Kasood" I have not been able to trace, for the tree is not an indigenous one. It is easily raised from seed, is of rapid growth, does not require frequent watering, and soon gives a large bushy head. One drawback to it is that from the hold the large head gives to the wind it is not unfrequently broken across in the squalls which usher in or conclude the monsoon. This tree also

has a bitter quality, which gives it immunity from the rats.

Tamarind.

Next may be placed the Tamarind, an excellent hardy tree, fitted for any soil, but in shallow ground requires to be surrounded by a small terrace of earth faced with rough stone. It has also the disadvantage of being rather slow in growth, and is quite as liable to destruction from rats as the Mango is. I have seen trees eight feet high thus cut off by having their stems gnawed across. The Tamarind has the advantage of being able to bear long drought.

Mango.

The Mango should be planted only where the soil is good, and where there is some indication of the vicinity of water. In all other situations it remains doddered and stumpy. It also requires more water than most of the other trees. Grafted Mangoes should never be planted anywhere on the roads, as they frequently die off under the influence of strong winds. As rats are very inimical to the Mango in its earlier stages (nor is it safe from them until it has reached a height of 10 feet), immediately on the burrowing of rats being observable near the plant, the precaution should be taken of putting one or more balls of arsenic, mixed with goor and gram-flour, into the mouth of the holes. Care should be taken to have these balls fully inside the holes, else they may be eaten by cattle.

Bendie (Thespesia populnea).

The Bendie makes an excellent road-tree in situations near the coast, but grows less freely at any distance from the sea. Therefore it cannot be recommended except for the Konkuns.

Shewun (Gmelina arborea).

A large and beautiful tree, of rapid growth, and flourishes even in inferior soil. Its only disadvantage is that in the months of March and April it sheds its leaves, but in the full strength of the hot season in May it becomes again covered with

leaf. It grows only from seed—at least I have never raised it in any other way; but it is probable enough that as it belongs to the same family as Teak, it can be raised from slips. I mean to try it by cuttings this season, and will hereafter report on it.

Mogeer (Odina wodier).

Is said to be a common tree planted on the Madras roads on the eastern side of the peninsula. I have not observed it in those of the western side as in Malabar.

It grows readily from cuttings, but does not seem a choice tree for planting, inasmuch as it remains leafless for a great part of the dry season and never gathers to a good head.

Ambara (Spondias acumihata).

Being of rapid growth and having a good head, it is well suited to lines of road in the Konkun, but above the Ghauts it is much less shady. The seed easily vegetates.

Dalbergia seesoo.

This imported tree is very different in its habit from our indigenous Seesoo (D. latifolia), which latter is very coy in its choice of situations for growth, and by no means bears well the open plain, whereas the former appears to grow rapidly and well anywhere, and just as freely above the Ghauts as it does below.

I observed it planted on the Esplanade at Mangalore growing with great freedom. It is also very easily raised from seed, which the tree furnishes in abundance. I have not yet had an opportunity of seeing whether it is liable to damage from rats as I have only very lately begun to give the seed out for road planting.

Ridleia Tileofolia, *alias* Glossospermum velutinum, not desirable.

I only mention this tree to give a caution against its being planted, as I observe it has in some quantity been on the Esplanade at Bombay. It is a short-lived, worthless article, very liable to be broken across by strong winds, and very deceitful by its rapid growth and leafiness in early youth.

A choice tree for growth on roads near the sea, as it is very leafy and beautiful in flower. It rapidly withers, and dies at any distance from the sea air; therefore this should be kept in view.

Calophyllum inophyllum (Oondie).

A hardy tree, having a strong stem and fine leafy head. Generally applicable to roads near the coast or in Khandeish, in the western part of which it is not uncommon. It is elsewhere rare, but seeds of it can in the season be furnished from the Botanical Garden.

Cedrela toona (Toona).

Seems also a hardy tree, and well fitted for coast situations—Gujarat and Khandeish; in the barren road soils of the Deccan it would remain stunted, as has by experiment been ascertained.

Swedenia Mahogani (Mahogany).

Unfortunately the thirty Mahogany trees we have in the Botanical Garden have not as yet afforded seed, but may be expected to do so in the course of the next few years.

Of these there are several species, as B. variegata, B. rabra, B. alba, &c., all hardy, easily raised from seed, and flourishing equally well in inland situations as in those near to the coast.

Bauhinia of sorts (Kunchun).

I mention this useful tree here as being one of the best for roads in the inland and upper country. It has one drawback, viz. that the shade which it affords is but imperfect, as the sun strikes through between the small leaves and branches, but the ease with which it is raised and its hardiness in growth render it desirable either for planting or for being kept up when it springs out naturally, as is often the case, near the other trees on the road line. Of all the varieties, which are three in number, the Ram Kanta, being the straight broom-like tree, is the most ornamental but less shady and spreading than the others.

Babool.

Fitted only for road-sides in the Konkun, as it does not grow so freely away from the sea. It has a fine shady head, is easily raised from seed,

Sterculia fœtida (Bastard Poon).

and is rapid in growth—liable, however, to be broken across in strong squalls.

Spathodea Roxburghii (Mer Seengee). A handsome, shady tree, but attaining its full development only in the countries near the coast. Many trees of it may be seen growing naturally on the road from Chowk to Campoolee.

Uvaria longifolia (Ashoca Asopalu). This forms a beautiful road-side tree for Gujarat and the Konkun, but hardly succeeds in the Deccan or other inland countries away from shelter or garden land; therefore this should be kept in view in choosing it for planting.

Phyllanthus emblica (Aonla). A rather hardy tree, which is shady, and appears to suit the inland countries as well as the coast. It is raised from seed.

Kurrunje (Pongamia glabra). A shady and strong tree, which grows most freely in the Konkun, but may be also planted in the Deccan, particularly in the low bottoms near to gullies and streams. It is raised from seed.

Willow. The Willow has been planted pretty plentifully in the inland country, particularly in places where the moisture is so great that no other trees will grow. Two rows of the Babylonian or Egyptian Willow may be seen as planted by me close to the north side of the road just west of Wurgaum. One or two of the indigenous Willows are mixed with them. The difference of the two is immediately discernible.

The above list will be found to comprise most of the trees which can be with advantage planted on roads. Others may be found suited to particular districts of country.

Hedging and further care of the Trees after having been planted. The seeds and cuttings having been planted and the earth filled in, no time should be lost in providing a hedge or some such defence for each plant.

Hedges. I have found it of advantage to distribute seeds

of Cæsalphinia bonduc (Sagurgota) or C. sepiaria (Chillur), to be inserted on the edge or margin of the holes at the time the seeds or cuttings are planted. These vegetate along with them, and shooting up rapidly form a good protection for the young stems. The best material for a hedge around the holes is the common Milkbush or Euphorbium, where this is procurable, but it is by no means common in many places, particularly in the eastern districts: where it is found it should be cut off and planted as soon as possible after the rain begins, avoiding places where water settles, as if planted in these it will rot off; also if planted in the decline of the rains, when the sap is descending (which is the case after August), it will wither and dry up under the easterly winds of October and November. Once established, it requires no further care, and gives effectual protection to the young trees.

In some places where the Euphorbium is not obtainable, the Prickly-pear is to be had; and when this is the case it should be laid down during the moist weather in a circle of five feet diameter around the young tree or the holes in which the seedlings are. It may then be left to its natural growth, which, as we well know, is in most places luxuriant enough. It is, however, not a choice material for hedges, if any other be attainable, as not only does it spread so as to be too near to and threaten to choke the trees, but it takes away much of the fertile materials of the soil, being in growth of a very exhausting nature; also after some years considerable expense must be incurred for the purpose of removing it from around the trees.

Bamboo Cages.

Supposing that neither Milkbush nor Prickly-pear are procurable, we must then endeavour to protect the trees by means of Bamboo cages, well open in the sides, and fixed in the ground by

means of one or more upright sticks. The lower edges of the cages must also be well earthed up, else they will be blown away by the first strong wind.

It appears to me, and the fact was also remarked by the late Dr. Stocks in his report to Government, made in 1852, that these cages have a very beneficial effect in drawing up the trees to growth by the head, and that in all practicable cases they should be had recourse to in preference to other hedging. It is necessary however, particularly in places near to where goats graze, to have some thorns put thinly round the cage to prevent goats, &c. from thrusting their heads in to bite off the top shoots of the plants.

Babool Branches.

In event of neither Milkbush, Prickly-pear, nor Bamboo for cages being obtainable in any quantity, we must then have recourse to the branches of such Babool trees as may be growing within the road limits, *i. e.* 10 feet from the gutter; or if these be not procurable, we must then seek for thorns from the scrubby bushes growing in Government waste land, or if practiable get a supply from the cultivators who may have holdings in the neighbourhood. It is not, however, in practice found to be an easy matter to procure thorns from this source, as the people not unfrequently require them for the fencing in of their own fields, or even if they do not, they are never willing to part with them to any officer of Government, although the benefit of trees to the vicinity of their fields (without their being so near as to encourage the settling of birds) is to them of no inconsiderable advantage.

In some situations the nature of the surrounding soil will admit of our raising around the tree a small rampart of earth, to be carried as high as the tenacity of the soil will permit of its being;

or at other times a loose wall of rough stones, particularly if those of a flattish shape, likely to lie well on each other, are procurable.

The practice of binding a handful of thorns on the upper part of the top shoot of the young tree has been before noticed as being very useful. It should in all practicable cases be done.

Having now completed the planting and fencing of the tree, I proceed to point out the further treatment necessary.

Care of the Trees.

For a plantation line of five hundred trees one man suffices, for hoeing, occasional repair of the fences, and all detail work.

Hoeing.

Supposing them to have been planted in the beginning of the rains, the holes may be expected to be well overgrown with grass by early in August. At this time the keeper should begin to hoe away the grass and weeds whenever the weather will admit of his doing so. In hoeing he should be instructed to take care that none of the seedlings in the holes, which by this time will have shot above the ground, are cut off or injured. It is best to bury the weeds at the edge of the hole, as thus some little return is afforded to the ground in the shape of manure, which generally cannot be furnished in any other way, excepting by taking advantage of the moist state of the weather and roads early in September, and raking off to put in the holes of the trees the half liquid mud which at this time may be expected to be found in quantities on the roads. It is of great consequence to heap on as much of this as possible, being careful that in doing so the young seedlings be not smothered. The keeper will be able to hoe at least twenty-five trees per day, which will enable him within the month of August (allowing for interruption caused by rain) to complete the clearing of the five hundred holes

Hedging. of which he has charge. The hedging will also be at this time in progress, it being usual to entertain four extra hands (for each division of five hundred) temporarily for the purpose of carrying it on. In case the Milkbush thorns be at some distance or on hills, six extra hands may be necessary for the two months August and September, but generally speaking four will be found sufficient.

I omitted to mention in its proper place that a very good material for hedges in the Konkun lines will be found to be the Physic nut (Jatropha lurcas) called also Pursia yerendia.

Also that in addition to the hedges it is found necessary in places where carts turn off the road to put up for the night to dig a pretty deep trench close to the outside of the hedge, otherwise the hedges and the trees in such situations will almost certainly be broken or trodden down by cattle.

I have tried heavy stones placed to the hedge for the purpose of warding off such mischief, but in practice we find that the cartmen or bullockmen always carry them away to serve for their cooking-places.

Keepers. The services of the man who has the care of the trees cannot be dispensed with for four or five years, as annually some renewals are necessary to fill up the voids caused by accidents.

Peons. Also a Peon is required to overlook the workmen in three Talookas or divisions, and after three years he may look after four Talookas.

As each Talooka or division contains five hundred trees, this will give him the supervision of from 1,500 to 2,000, to be extended according to circumstances. At present I have one Peon from the Khandalla Ghaut to Dapoorce Bridge, a distance of about forty miles, and containing in the

whole line about 8,150 trees. Also in the same distance one Keeper now serves for six to seven miles, there being in all six Keepers for this distance. Were the road a less frequented one so many would not be necessary. Below the Ghaut, from Campoolee to Panwell, the number of Keepers for the distance of twenty-six miles is three, and there is now no necessity for a Peon there as but a few of the trees require water, or are so low as to be within the reach of the mouths of cattle or goats.

Another important part of the Peons' duty is to watch the proceedings of the Puckalmen employed in watering the trees.

Watering the Trees.

For five hundred trees I allow during the first open season three Puckals. As in common situations it will be found that one man and bullock will not water more than thirty to forty per day, it may be calculated that two more Puckals will water one hundred daily.

This allows of water being given to each hole once in five days, and it will be found that on a dry dusty road, particularly where the trees have little else than moorum or broken rock to grow on, this is the least amount of water which can be safely given to them for the first season.

It ought to be known that some descriptions of moorum are much more retentive of water than others.

Thus what is known by the name "Telia moorum," and which may be distinguished by its colour, varying from a light fawn to a deep brown, and which is in fact the *débris* or decomposing coats of the highly crystallised boulders of black basalt, is greatly more retentive of moisture than the grey crumbly shale-like material which is probably the more common of the two. In the former all trees, particularly the Fig tribe

and Neem, shoot up much more rapidly than in the latter. The proportion of water to be given to each tree ought to be one-third of a Puckal.

After the first season has passed, and the trees have enjoyed the benefit of a second monsoon, the number of Puckals during the ensuing open season may be reduced to two, and (except in particular situations) in the third year to one.

One may still be necessary even for a fourth or fifth year in case there have been many renewals ; but after that period the water for the few renewals which should be necessary can be provided either by the Keeper affording it by head loads, or by apportioning one Puckal to three Talookas of 1,500 trees. Variations in the foregoing estimate must of course be occasionally necessary, owing to particular circumstances, such as soil, climate, and distance of water. When the trees have reached a size sufficient to enable a hedge to be dispensed with, it may be cut away, but at the same time a small bundle of thorns should be bound round each tree, in order to prevent the rubbing of cattle against the stem, and it is at this time that the small platform of earth faced with rough stone and surrounding the stem to the height of one or one and a half feet is of the greatest service. At the close of the rains in each year it becomes necessary to raise the earth somewhat at the edges of the holes, so as to form a basin to receive the water given, and again, just before the commencement of the rains, this raised edge should be levelled down, and the earth heaped towards the root of the main tree, or of the seedlings, so as to prevent the water settling.

This latter procedure is more especially necessary in places like the Karlee plain, where the water will otherwise settle in quantity about the roots, and thus destroy the tree.

After the trees have been for some years in the ground, it will often be found that owing to all the seedlings having vegetated there may be from four to five in each hole.

Of these, some may be cautiously thinned out from time to time, taking care to choose for this purpose the least valuable ones; but as the danger from rats is always to be kept in view for the first seven years, it is not advisable to reduce the number of trees in the hole to one all at once.

Estimate of Expense.

Accompanying this will be found an estimate of the expense of preparing the ground for planting, tending, hedging, and watering 2,000 trees for four years. The estimate is merely approximative, as no calculation can be made which shall be exactly applicable to all situations, but this one may be deemed a fair average:—

Preparing holes for 2,000 trees, at 3 annas each, inclusive of moorum and pad-rock excavation, &c. tool-sharpening, &c. ..... Rs.	375	0	0
16 hands for filling in earth, carrying and planting cuttings and seeds, for two months, at Rs. 3-12-0 each	120	0	0
16 ditto for two months, for carrying hedge materials and for hedging	120	0	0
12 Puckals, for seven months, at Rs. 7 per month	588	0	0
Second year, 8 ditto for seven months, at ditto	392	0	0
Third year, 4 ditto at Rs. 7 for seven months	196	0	0
4 Keepers for five years, at Rs. 180 per annum	900	0	0
Carried over ..... Rs.	2,691	0	0

Brought over.... Rs.	2,691	0	0
1 Peon for four years, at Rs. 60 per annum	240	0	0
Add contingencies, such as occasional watering after planting in case rain should have been scanty, pots, poison for rats, &c., and Karkooning 10 per cent ..	292	12	0
Total, Rupees three thousand two hundred and twenty-three, Annas twelve	3,223	12	0

A. GIBSON,
Conservator of Forests.

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